IEI Technology Corp.

Enano-8523T

ULV Intel Celeron M 800 MHz zero cache with COM ports, USB2.0 and TPM 1.2 security function support

USER MANUAL

Rev. 1.0,Mayl 2006

RoHS Lead Free

REVISION HISTORY

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Table of Contents

1 INTRODUCTION 13

1.1 ENANO-8523T BOARD OVERVIEW 14

1.1.1 Enano-8523T Board Variations 14

1.1.2 Enano-8523T Board Applications 14

1.1.3 Enano-8523T Board Benefits 14

1.1.4 Enano-8523T Board Features 15

1.2 ENANO-8523T BOARD OVERVIEW 16

1.2.1 Enano-8523T Board Connectors 17

1.2.2 Technical Specifications 18

2 DETAILED SPECIFICATIONS 21

2.1 CPU SUPPORT 22

2.2 ONBOARD CHIPSETS 22

2.2.1 Northbridge and Southbridge Chipsets 22

2.2.2 Intel® 852GM Northbridge Chipset 22

2.2.3 Intel® ICH4 Southbridge Chipset 23

2.3 DATA FLOW 24

2.4 GRAPHICS SUPPORT 25

2.5 MEMORY SUPPORT 26

2.6 TPM SUPPORT 26

2.7 PCI BUS INTERFACE SUPPORT 27

2.8 10/100 BASE-T INTERNET 28

2.9 IDE DEVICE SUPPORT 28

2.10 REAL TIME CLOCK 28

2.11 SYSTEM MONITORING 28

2.12 USB INTERFACES 29

2.13 BIOS 29

2.14 OPERATING TEMPERATURE AND TEMPERATURE CONTROL 29

2.15 AUDIO CODEC 30

2.16 POWER CONSUMPTION 31

2.17 PACKAGED CONTENTS AND OPTIONAL ACCESSORY ITEMS 31

2.17.1 Package Contents 31

3 CONNECTORS AND JUMPERS 33

3.1 PERIPHERAL INTERFACE CONNECTORS 34
3.1.1 Enano-8523T Board Layout 34
3.1.2 Peripheral Interface Connectors 35
3.1.3 Rear Panel Connectors 36
3.1.4 Onboard Jumpers 36
3.2 INTERNAL PERIPHERAL CONNECTORS 37
3.2.1 IDE Connector 37
3.2.2 DIO Connector 38
3.2.3 Battery Connector 39
3.2.4 Front Panel Connector 40
3.2.5 USB Connector 41
3.2.6 Fan Connector 42
3.2.7 ATX Power Connector 43
3.2.8 Power Connector 44
3.2.9 Keyboard/Mouse Connector 45
3.2.10 COM4 Connectors 46
3.2.11 Parallel Port Connector 47
3.2.12 Inverter Connector 48
3.2.13 LVDS Connector 50
3.2.14 SODIMM Socket 51
3.2.15 Compact Flash Type 2 Socket 52
3.3 EXTERNAL (REAR PANEL) CONNECTORS 54
3.3.1 Serial Port Connectors 54
3.3.2 USB Connectors 55
3.3.3 Ethernet Connector 55
3.3.4 VGA Connector 56
3.3.5 Audio Connector 57
3.4 ONBOARD JUMPERS 58
3.4.1 Reset CMOS Jumper 59
3.4.2 CF Card Setup 59
3.4.3 LCD Voltage Setup 60

4 INSTALLATION AND CONFIGURATION 61

4.1 INSTALLATION CONSIDERATIONS 62
4.1.1 Installation Notices 62

4.2 UNPACKING 63
4.2.1 Unpacking Precautions *63*
4.2.2 Checklist *63*
4.3 ENANO-8523T BOARD INSTALLATION 64
4.3.1 Preinstalled Components *64*
4.3.2 Components to Install *65*
4.3.3 DIMM Module Installation *65*
4.3.3.1 Purchasing the Memory Module 65
4.3.3.2 DIMM Module Installation 65
4.3.4 Peripheral Device Connection *66*
4.3.4.1 IDE Disk Drive Connector (IDE1) 66
4.3.4.2 Keyboard/Mouse Connection 67
4.4 CHASSIS INSTALLATION 67
4.5 REAR PANEL CONNECTORS 67
4.5.1 LCD Panel Connection *67*
4.5.2 Ethernet Connection *67*
4.5.3 USB Connection *68*

5 AMI BIOS SETUP 69

5.1 INTRODUCTION 70
5.1.1 Starting Setup *70*
5.1.2 Using Setup *70*
5.1.3 Getting Help *71*
5.1.4 Unable to Reboot After Configuration Changes *71*
5.1.5 BIOS Menu Bar *71*
5.2 MAIN 72
5.3 ADVANCED 73
5.3.1 CPU Configuration *74*
5.3.2 IDE Configuration *75*
5.3.2.1 IDE Master, IDE Slave 77
5.3.3 Super IO Configuration *83*
5.3.4 Hardware Health Configuration *87*
5.3.5 ACPI Configuration *89*
5.3.6 MPS Configuration *90*
5.3.7 Trusted Computing *90*
5.3.8 USB Configuration *92*

5.4 BOOT 96
5.4.1 Boot Settings Configuration *97*
5.4.2 Boot Device Priority *99*
5.4.3 Hard Disk Drives *101*
5.4.4 Removable Drives *101*
5.4.5 CD/DVD Drives *104*
5.5 SECURITY 104
5.6 CHIPSET 106
5.6.1 Northbridge Configuration *107*
5.7 POWER 113
5.8 EXIT 114

6 SOFTWARE DRIVERS 117

6.1 AVAILABLE SOFTWARE DRIVERS 118
6.2 CHIPSET DRIVER INSTALLATION 118
6.3 REALTEK AUDIO DRIVER INSTALLATION 121
6.4 INTEL GRAPHICS MEDIA ACCELERATOR DRIVER 126
6.5 LAN DRIVER INSTALLATION 129

A BIOS CONFIGURATION OPTIONS 133

A.1 BIOS CONFIGURATION OPTIONS 134

B WATCHDOG TIMER 137

C ADDRESS MAPPING 141

C.1 IO ADDRESS MAP 142
C.2 1ST MB MEMORY ADDRESS MAP 142
C.3 IRQ MAPPING TABLE 143
C.4 DMA CHANNEL ASSIGNMENTS 143

D EXTERNAL AC'97 AUDIO CODEC 145

D.1 INTRODUCTION 146
D.2 DRIVER INSTALLATION 146
D.3 SOUND EFFECT CONFIGURATION 147
D.4 SOUND EFFECT 148
D.5 ENVIRONMENT SIMULATION 149
D.6 KARAOKE MODE 150
D.7 EQUALIZER SELECTION 151

D.8 SPEAKER CONFIGURATION 152
D.9 SPEAKER TEST 153
D.10 S/PDIF-IN & S/PDIF-OUT 154
D.11 CONNECTOR SENSING 154
D.12 HRTF DEMO 157
D.13 MICROPHONE EFFECT 157
D.14 GENERAL 158

E INDEX 159

List of Figures

Figure 1-1: Enano-8523T Board Overview (Top View)....16
Figure 1-2: Enano-8523T Board Overview (Bottom View)....17
Figure 2-1: Data Flow Block Diagram....24
Figure 3-1: Connector and Jumper Locations (Top Side)....34
Figure 3-2: Connector and Jumper Locations (Bottom Side) 35
Figure 3-3: IDE Connector Location....38
Figure 3-4: DIO Connector Location 39
Figure 3-5: Battery Connector Location 40
Figure 3-6: Front Panel Connector Location....41
Figure 3-7: USB Connector Location 42
Figure 3-8: Table 3-9: FAN1 Connector Location 43
Figure 3-9: Power Connector Location....44
Figure 3-10: Power Connector Location....45
Figure 3-11: Keyboard/Mouse Connector Location....46
Figure 3-12: COM4 Connector Location 47
Figure 3-13: Parallel Port Connector Location....48
Figure 3-14: Inverter Connector....49
Figure 3-15: LVDS Connector 51
Figure 3-16: SODIMM Socket Location (Rear Side)....52
Figure 3-17: CFII Socket Location (Rear Side)....53
Figure 3-18: Enano-8523T Board Rear Panel 54
Figure 3-19: RJ-45 Ethernet Connector 56
Figure 3-21: Jumper Locations....58
Figure 6-1: InstallShield Wizard Preparation Screen.... 119
Figure 6-2: Welcome Screen 119
Figure 6-3: License Agreement.... 120
Figure 6-4: Readme Information 120
Figure 6-5: Restart the Computer 121
Figure 6-6: Audio Driver Install Shield Wizard Starting 122

Figure 6-7: Audio Driver Setup Preparation 122
Figure 6-8: Audio Driver Welcome Screen 123
Figure 6-9: Audio Driver Software Configuration 123
Figure 6-10: Audio Driver Digital Signal 124
Figure 6-11: Audio Driver Installation Begins 125
Figure 6-12: Audio Driver Installation Complete..... 126
Figure 6-13: GMA Driver Installation Welcome Screen 127
Figure 6-14: GMA Driver License Agreement..... 128
Figure 6-15: GMA Driver Installing Notice 128
Figure 6-16: GMA Driver Installation Complete 129
Figure 6-17: LAN License Agreement 130
Figure 6-18: Select the Driver Directory 130
Figure 6-19: LAN Driver Configuration 131

List of Tables

Table 1-1: Technical Specifications 19
Table 2-1: Power Consumption 31
Table 3-1: Peripheral Interface Connectors 36
Table 3-2: Peripheral Interface Connectors 36
Table 3-3: Onboard Jumpers 37
Table 3-4: IDE Connector Pinouts 38
Table 3-5: DIO Connector Pinouts 39
Table 3-6: Front Panel Connector Pinouts 40
Table 3-7: USB Connector Pinouts 41
Table 3-8: FAN1 Pinouts 42
Figure 3-8: Table 3-9: FAN1 Connector Location 43
Table 3-10: Power Connector Pinouts 43
Table 3-11: Power Connector Pinouts 44
Table 3-12: Keyboard/Mouse Connector Pinouts 45
Table 3-13: COM4 Connector Pinouts 46
Table 3-14: Parallel Port Connector Pinouts 48
Table 3-15: Inverter Connector Pinouts 49
Table 3-16: LVDS Connector Pinouts 50
Table 3-17: CFII Socket Pinouts 53
Table 3-18: Serial Port Pinouts 55
Table 3-19: USB Connectors 55
Table 3-20: RJ-45 Ethernet Connector Pinouts 56
Table 3-21: RJ-45 Ethernet Connector LEDs 56
Table 3-22: VGA Connector Pinouts 57
Table 3-23: JP2 Jumper Settings 59
Table 3-24: JP4 Jumper Settings 60
Table 3-25: JP6 Jumper Settings 60
Table 4-1: IEI Provided Cables 66
Table 5-1: BIOS Navigation Keys 71

List of BIOS Menus

Menu 1: Main 72
Menu 2: Advanced.....74
Menu 3: CPU Configuration 75
Menu 4: IDE Configuration 76
Menu 5: IDE Master and IDE Slave Configuration 78
Menu 6: Super IO Configuration 83
Menu 7: Hardware Health Configuration 88
Menu 8: ACPI Configuration 89
Menu 9: MPS Configuration 90
Menu 10: Trusted Computing 91
Menu 11: USB Configuration 93
Menu 12: USB Mass Storage Device 95
Menu 13: Boot 96
Menu 14: Boot Settings Configuration.....97
Menu 15: Boot Device Priority Settings 100
Menu 16: Removable Drives 103
Menu 17: Security..... 105
Menu 18: Chipset..... 107
Menu 19:Northbridge Chipset Configuration 108
Menu 20:Power 113
Menu 21:Exit 115

Glossary

AC '97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	Compact Flash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
TPM	Trusted Platform Module
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

Chapter

1

Introduction

1.1 Enano-8523T Board Overview

The EPIC form factor Enano-8523T ULV Intel Celeron M embedded board is fully equipped with a high performance processor and advanced multi-mode I/Os. The Enano-8523T is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price. The Enano-8523T supports the TPM 1.2 (Trusted Platform Module) hardware security function.

1.1.1 Enano-8523T Board Variations

IEI currently provides two Enano-8523T board variations. These are:

- **Enano-8523-800Z-R10**: (No TPM1.2 support)
  An EPIC form factor board with an onboard zero cache ULV Intel Celeron M 800MHz CPU and LCD/CRT VGA, LAN, USB2.0, Audio, and COM ports.
- **Enano-8523T-800Z-R10**: (Supports TPM1.2)
  An EPIC form factor board with an onboard zero L2 cache ULV Intel Celeron M 800MHz CPU and LCD/CRT VGA, LAN, USB2.0, Audio, and COM ports. This board also supports the TPM 1.2 hardware security function.

1.1.2 Enano-8523T Board Applications

The TPM 1.2 hardware security function implemented on the Enano-8523T makes this board ideal for applications that require durable, yet secure platforms and were data privacy issues are critical. These applications may include:

- Automation applications
- Banking applications
- Healthcare applications
- Military applications

1.1.3 Enano-8523T Board Benefits

The TPM 1.2 hardware security function implemented on the Enano-8523T can,

- Protect secrets from attackers
- Perform cryptographic functions

  - RSA, SHA-1, RNG
  - Meets encryption export requirements
- Create, store and manage cryptographic keys
- Provide a unique Endorsement Key (EK)
- Performs digital signature operations
- Hold platform measurements (hashes)
- Anchor chain of trust for keys, digital certificates and other credentials

1.1.4 Enano-8523T Board Features

Some of the Enano-8523T board features are listed below:

- Complies with EPIC form factor
- Complies with RoHS
- Preinstalled 800MHz Intel Celeron M CPU
- Preinstalled CPU heat sink
- Supports a maximum front side bus (FSB) speed up to 400MHz
- Supports up to 1GB of 266MHz or 200MHz single channel DDR memory
- Supports dual independent displays, CRT display and 18-bit LVDS flat panel screens
- Complete I/O support with
  - 4 x COM ports
  - 1 x IDE device
  - 1 x CFII
  - 1 x Intel LAN
  - 4 x USB2.0

1.2 Enano-8523T Board Overview

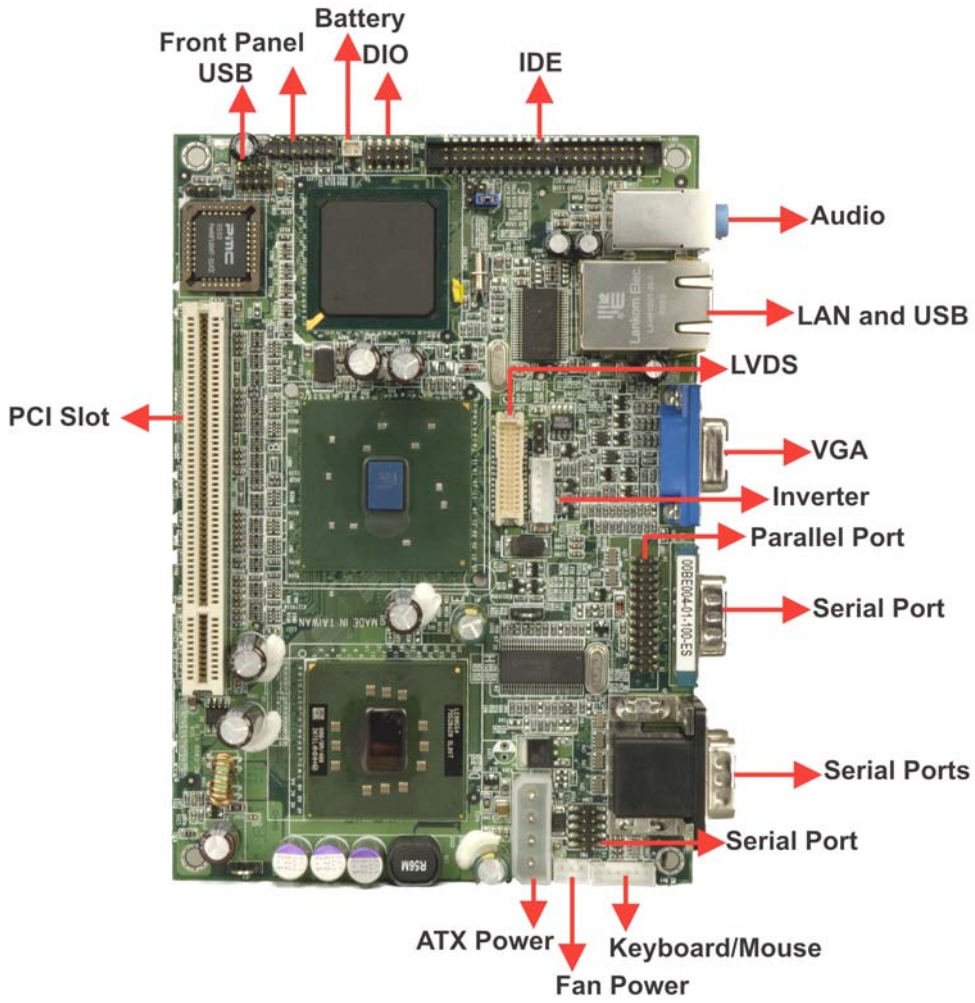

Figure 1-1: Enano-8523T Board Overview (Top View)

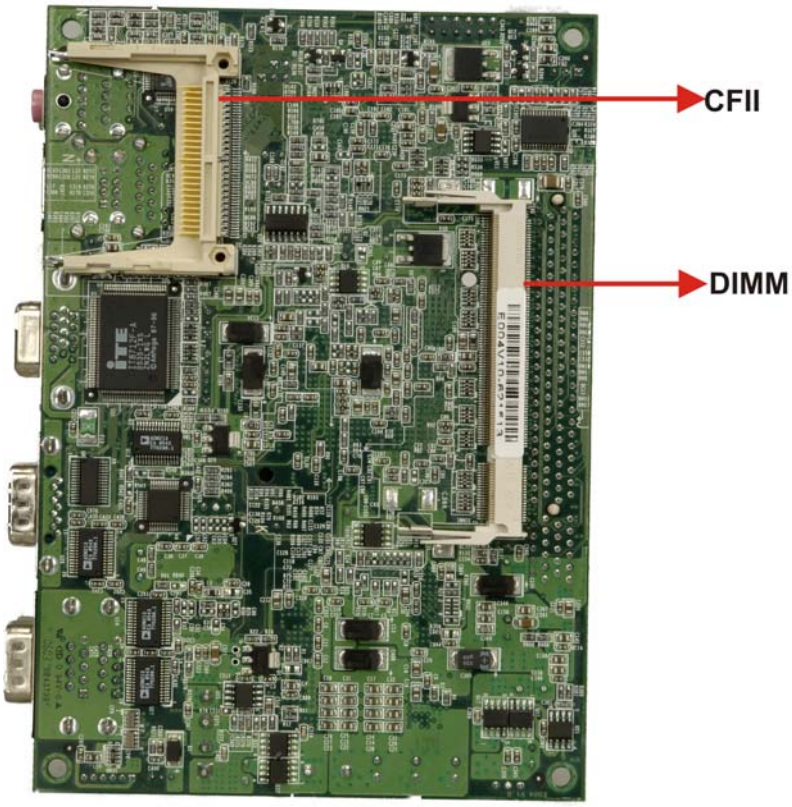

Figure 1-2: Enano-8523T Board Overview (Bottom View)

1.2.1 Enano-8523T Board Connectors

The Enano-8523T board has the following connectors onboard:

- 1 x PCI slot
- 1 x Front panel connector
- 1 x IDE device connector
- 1 x Compact flash connector
- 1x Parallel port connector
- 1 x RS-232 serial port connector
- 1x USB 2.0 connector
- 1 x LCD LVDS interface Connector
- 1 x Inverter power connector
- 1 x DIO connector
- 1 x Keyboard/mouse connector
- 1 x ATX connector

- 1 x Fan connector
- 1 x PCI slot
- 1 x DDR SDRAM SODIMM socket

The Enano-8523T board has the following connectors on the board rear panel:

- 3 x Serial port connectors (COM)
- 1 x VGA connector
- 1 x RJ-45 Ethernet connector
- 2 x USB 2.0 ports
- 1 x Audio connector (3 x audio jacks)

The location of these connectors on the Enano-8523T can be seen in **Figure 1-1** and **Figure 1-2**. These connectors are fully described in Chapter 3.

1.2.2 Technical Specifications

Enano-8523T board technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in ***Chapter 2 Detailed Specifications***.

SPECIFICATION	
CPUs Supported	Intel® Celeron® M
Chipsets	Northbridge: Intel® 852GM Southbridge: Intel® ICH4
I/O Controller	ICH4
Graphics Support	Intel® Extreme Graphics 2
Memory	One DDR SDRAM SODIMM memory module (Max. 1GB)
PCI Bus Interface	33MHz, Revision 2.3
HDD Interface	One IDE channel supports two Ultra ATA 100/66/33 devices
USB Interfaces	Four USB 2.0 connectors supported

Serial Ports	Four COM ports
Real Time Clock	256-byte battery backed CMOS RAM
Hardware Monitoring	Cooling fans, temperature and system voltages
Power Management	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
Ethernet	10/100 Base-T Intel 82562ET
BIOS	AMI flash BIOS
Physical Dimensions	115mm x 165mm (width x length)
Weight	GW: 1.1 Kg NW: 0.95 Kg
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)
Audio Interfaces	AC’ 97 Codec Realtek ALC655

Table 1-1: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 CPU Support

The Enano-8523T board comes with a preinstalled ultra low voltage (ULV) Intel® Celeron® M 800MHz zero cache processor. The 800MHz Intel® Celeron® M processor has the following features and specifications:

- Operates at 1.004 volts
- Thermal design power (TDP) of 7 watts
- 400 MHz system bus
- 512 KB L2 cache
- Advanced mobile power management, including Deep Sleep states, helps enable longer battery life by minimizing the power consumption of the processor during brief periods of inactivity by the user.

2.2 Onboard Chipsets

2.2.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- **Northbridge**: Intel® 852GM
- **Southbridge**: Intel® ICH4

The following two sections (**Section 2.2.2** and **Section 2.2.3**) list some of the features of the Intel® 852GM and the Intel® ICH4 chipsets. For more information on these two chipsets please refer to the Intel website.

2.2.2 Intel® 852GM Northbridge Chipset

The Intel® 852GM Northbridge chipset comes with the following features:

- Supports Intel® NetBurst® micro-architecture
- 400 MHz system bus delivers a high-bandwidth connection between the processor and the platform
- Supports integrated graphics utilizing Intel® Extreme Graphics 2 technology
- Three USB host controllers provide high performance peripherals with 480 Mbps of bandwidth, while enabling support for up to six USB 2.0 ports.

- The latest AC ’97 implementation delivers 20-bit audio for enhanced sound quality and full surround-sound capability.
- LAN Connect Interface (LCI) provides flexible network solutions such as 10/100 Mbps Ethernet and 10/100 Mbps Ethernet with LAN manageability
- Dual Ultra ATA/100 controllers, coupled with the Intel® Application Accelerator supports faster IDE transfers to storage devices
- Intel Application Accelerator software provides additional performance over native ATA drivers by improving I/O transfer rates and enabling faster O/S load time, resulting in accelerated boot times

2.2.3 Intel® ICH4 Southbridge Chipset

The ICH4 provides extensive I/O support. Functions and capabilities include:

- PCI Local Bus Specification, Revision 2.2-compliant with support for 33 MHz PCI operations.
- PCI slots (supports up to 6 Req/Gnt pairs)
- ACPI Power Management Logic Support
- Enhanced DMA controller, Interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- USB host interface with support for six USB ports; three UHCI host controllers; one EHCI high-speed
- USB 2.0 Host controller
- Integrated LAN controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I^2C devices
- Supports Audio Codec ’97, Revision 2.3 specification (a.k.a., AC ’97 Component Specification, Revision 2.3)
- Link for Audio and Telephony codecs (up to seven channels)
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Alert On LAN* (AOL) and Alert On LAN 2* (AOL2)

2.3 Data Flow

Figure 2-1 shows the data flow between the two onboard chipsets and other components installed on the Enano-8523T and described in the following sections of this chapter.

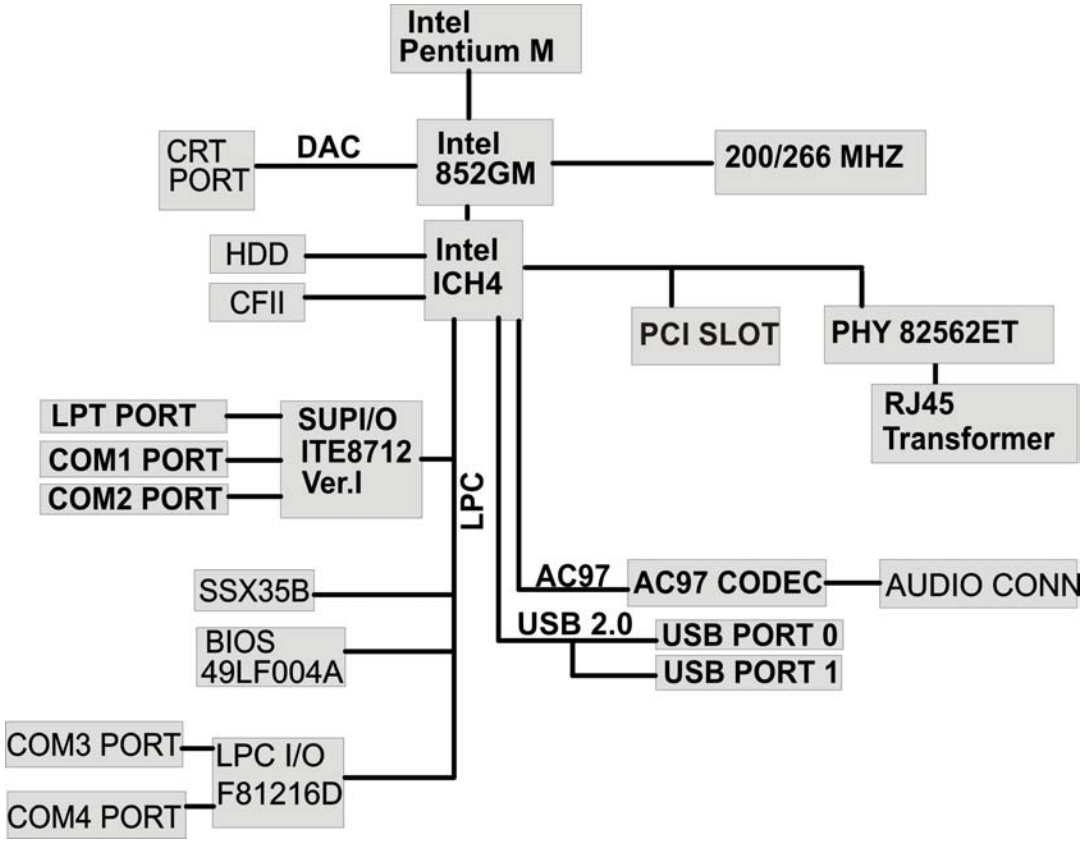

Figure 2-1: Data Flow Block Diagram

2.4 Graphics Support

The Intel® Extreme Graphics 2 is integrated on the Intel® 852GM Northbridge chipset. The Intel® Extreme Graphics 2 features are listed below.

- **Enhanced Rapid Pixel and Texel Rendering**: Optimized visual quality and performance from the addition of hardware to support of texel formatting, bicubic filter, color blending accuracy, and video mixing render, resulting in optimized visual quality and performance.
- **Zone Rendering 2 Technology**: Enhances the performance of zone rendering by using larger zones and new commands that improve graphics pipeline efficiency.
- **Dynamic Video Memory Technology v2.0**: Increases total system performance by optimizing the efficiency of AGP dynamic video memory by increasing its size of Video RAM allocation to 96 MB.
- **Enhanced Intelligent Memory Management**: Improves memory bandwidth efficiency and platform performance by improving the memory management arbitration between CPU, system memory and graphics memory.

Intel® Extreme Graphics 2 specifications are listed below:

- **Enhanced 2D**:
  - 256-bit internal path
  - 8/16/32bpp
  - DirectDraw*, GDI, GDI+
  - Anti-aliased text support
  - Alpha blending
  - Alphas stretch blitter
  - Hardware alpha blended RGB cursor
  - Color space conversion
  - 5x2 overlay support
  - Rotate, scale and translate operations
- **High-performance 3D**:
  - 256-bit internal path
  - 32bpp/ 24ZorW/ 8 Stencil
  - DX7*/DX8*/OGL*1.1

- DXTn texture compression
- Up to 4 textures / pixel on a single pass
- Cubic reflection map
- Embossed/DOT3 bump mapping
- Multi-texture
- DOT3 bump-mapping
- Point sprites

- **Video and Display**:
  - DirectShow*/DirectVA*
  - Hardware motion compensation support for DVD playback
  - 4x2 overlay filter
  - 350 MHz DAC frequency
  - Maximum DVO pixel rate of up to 330MP/s
  - Flat panel monitors and TV-out support via AGP Digital Display (ADD) cards
  - 350 MHz DAC for 1800x1440 @ 85Hz max CRT resolution or 2048x1536@60Hz max FP resolution
  - Synchronous display for dual monitor capabilities
  - 350MHz RAMDAC for up to QXGA analog monitor support
  - Dual DVO ports for up to QXGA digital display support
  - Multiple display types (LVDS, DVI, TV-out, CRT)

2.5 Memory Support

The Enano-8523T comes with one 200-pin DDR 266/200MHz SODIMM SDRAM socket and supports up to 1GB of SDRAM

2.6 TPM Support

The Enano-8523T is equipped with a SINOSON SSX35 Trusted Platform Module (TPM). The SSC complies with TCG v1.2 (Trusted Computing Group). The TPM security processor is a single-chip security subsystem that protects the end user's privacy by providing tamper-proof storage and management of the user's identity, passwords and encryption keys.

TPM features include:

- Fully compatible with TCG v1.2 Specification.
- Sinosun 8-bits CPU Core.
- Embedded 16KB secure data FLASH memory and 16KB RAM
- 128KB program FLASH memory supporting online update of Firmware.
- RSA engine supports up to 2048 bits RSA algorithm.
- Embedded SHA-1 algorithm engine.
- Integrated RNG for key generation and encryption transmission.
- LPC interface and serial interface in conformance to ISO 7816 Standard.

TPM parameters are:

- Supply Voltage:3.3V ∓10%
- Frequency:33MHz
- Program Space:128KB FLASH memory and 64KB ROM
- Data Space:16KB FLASH memory and 16KB RAM
- Work Current:< 30mA
- IdleCurrent:< 0.1mA
- Speeds:
  - RSA 2048 bits Signature (Decryption):<300ms
  - RSA 2048 bits Verification (Encryption):<40ms
  - RSA 1024 bits Signature (Decryption):<120ms
  - RSA 1024 bits Verification (Encryption):<15ms
  - SHA-1(1M bits) Computing Speed:<258ms
  - 2048 bits RSA Key pair generation:<10 Seconds

2.7 PCI Bus Interface Support

The PCI bus on the Enano-8523T board has the following features:

- 33MHz Revision 2.2 is implemented
- Maximum throughput: 133MB/sec
- One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
- 64-bit addressing supported

2.8 10/100 Base-T Internet

The onboard Intel 82562ET controller provides 10/100 Base-T Internet connectivity to the system. The Intel 82562ET controller specifications are below.

- IEEE 802.3 10BASE-T compliant physical layer interface
- IEEE 802.3u Auto-Negotiation and 100BASE-TX support
- Digital adaptive equalization control
- Link status interrupt capability
- XOR Tree mode support for board testing
- 3-port LED support (speed, link and activity)
- 10BASE-T auto-polarity correction
- Diagnostic loop back mode
- 1:1 transmit transformer ratio support
- Low power (300 mW) typical in active transmit mode
- Reduced power(less than 50 mW) in "unplugged mode"
- Automatic detection of "unplugged mode"
- 3.3V device
- Platform LAN connect interface support

2.9 IDE Device Support

The Enano-8523T comes with one IDE device connector and that can be connected to two IDE devices.

2.10 Real Time Clock

256-byte battery backed CMOS RAM

2.11 System Monitoring

The Enano-8523T board is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.12 USB Interfaces

The Enano-8523T board has six USB interfaces, four internal and two external. The USB interfaces support USB 2.0.

2.13 BIOS

The Enano-8523T board uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.14 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the Enano-8523T board are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

NOTE:

The Enano-8523T comes with a preinstalled heat sink and CPU. The heat sink should not be removed during operation. If the CPU is replaced, prior to running the system, the heat sink must be reinstalled on the Enano-8523T.

2.15 Audio Codec

The Enano-8523T has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications
- Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
- 14.318MHz -> 24.576MHz PLL to eliminate crystal
- 12.288MHz BITCLK input
- Integrated PCBEEP generator to save buzzer
- Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- LINE input shared with surround output; MIC input shared with Center and LFE output
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible

- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode
- AVRack® Media Player
- Configuration Panel for improved user convenience

2.16 Power Consumption

Table 2-1 shows the power consumption parameters for the Enano-8523T when a zero cache ULV Celeron M CPU is running with a clock speed of 800MHz and a 256MB 266MHz DDR.

Voltage	Current
+5V	**3.66A**
+12V	**0.2A**

Table 2-1: Power Consumption

2.17 Packaged Contents and Optional Accessory Items

2.17.1 Package Contents

When you unpack the Enano-8523T you should find the following components.

- 1 x Enano-8523T single board computer
- 1 x Keyboard/ PS2 mouse cable (P/N: 32000-023800-RS)
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x IDE flat cable 44p/44p (P/N: 32200-000009-RS)
- 1 x QIG (quick installation guide)

An optional parallel port cable (P/N: 19800-000049-RS) can also be ordered and shipped with the Enano-8523T.

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Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

The locations of the peripheral interface connectors are shown in **Section 3.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 3.1.2**.

3.1.1 Enano-8523T Board Layout

Figure 3-1 and **Figure 3-2** shows the onboard peripheral connectors, rear panel peripheral connectors and onboard jumpers.

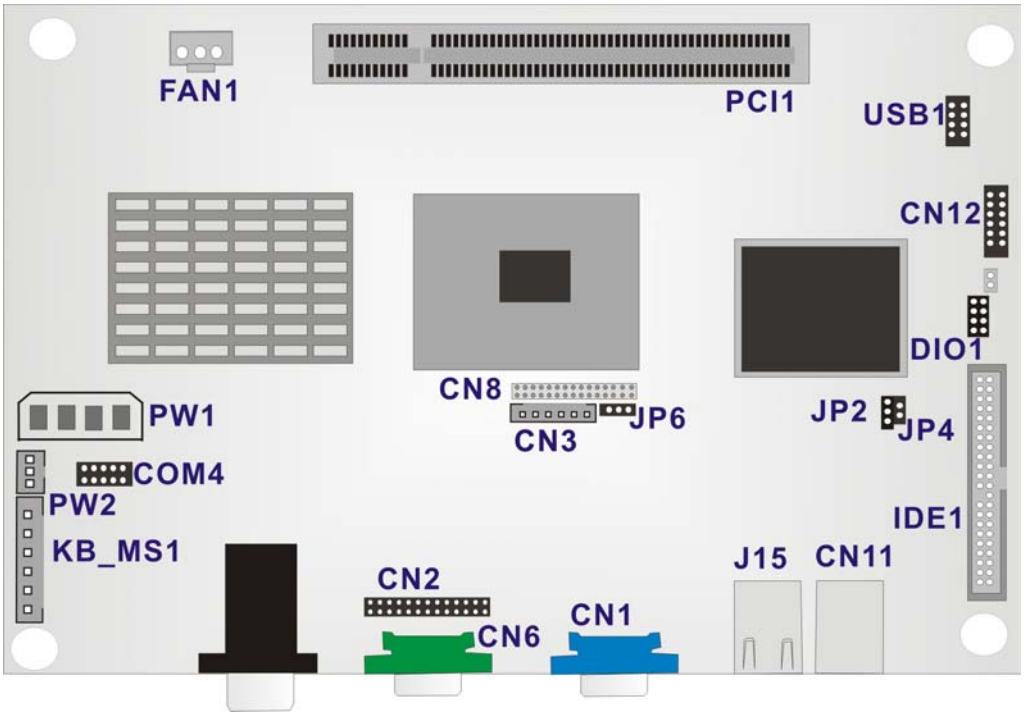


Figure 3-1: Connector and Jumper Locations (Top Side)

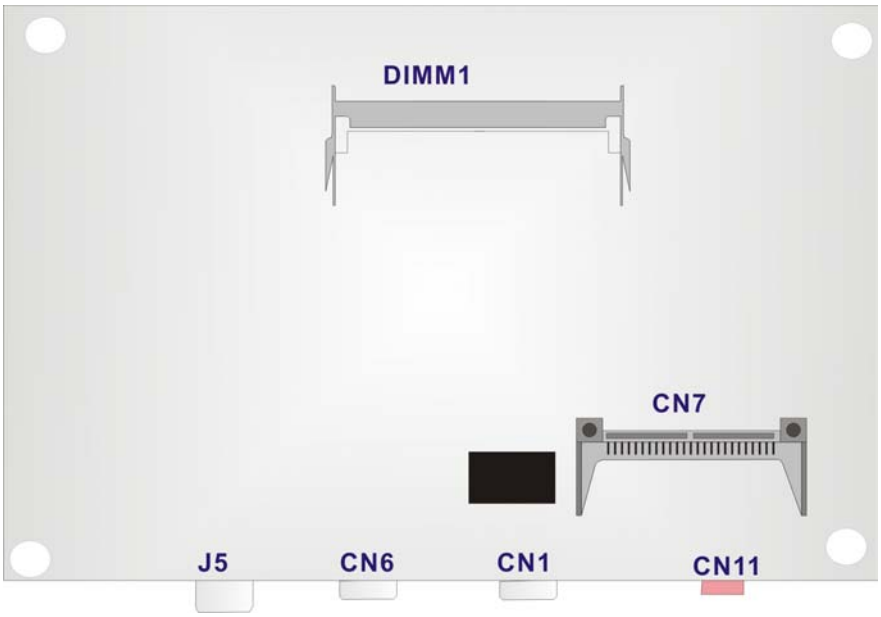


Figure 3-2: Connector and Jumper Locations (Bottom Side)

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the Enano-8523T board. Detailed descriptions of these connectors can be found in ***Section 3.2*** on ***page 37***.

Label	Connector	Type
IDE1	HDD connector	44-pin header
DIO1	Digital Input Output Connector	10-pin header
BT1	Battery Connector	2-pin header
CN12	Front Panel Connector	12-pin header
COM2	Serial communications connector	5-pin header
USB1	USB 2.0 connector for two USB devices	8-pin header
PCI1	Rev 2.2 PCI slot for PCI card	124-pin PCI slot
PW1	Board 12V power connector	4-pin header
PW2	System cooling fan connector	3-pin header

KB_MS1	Keyboard/Mouse connector	6-pin header
CN2	Parallel port connector	26-pin header
CN8	LVDS connector	30-pin header
CN3	Inverter connector	6-pin header
DIMM1	SODIMM slot	200-pin slot
CN7	CFII connector	50-pin

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the Enano-8523T board. Detailed descriptions of these connectors can be found in **Section 0** on **page 50**.

Label	Connector	Type
CN1	VGA Connector	15-pin VGA connector
CN6	COM3 connector	9-pin serial port connector
J5	COM1 and COM2 connectors	2 x 9-pin serial port connectors
J15	Ethernet connector Two USB 2.0 ports	RJ-45 connector USB port connectors
CN11	Audio connector	3 x audio jacks

Table 3-2: Peripheral Interface Connectors

3.1.4 Onboard Jumpers

Table 3-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in **Section 3.3.5** on **page 57**.

Label	Connector	Type
JP2	Clear CMOS	3-pin header

JP4	**CF card setup**	**2-pin header**
JP6	**LCD voltage setup**	**3-pin header**

Table 3-3: Onboard Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the board and are only accessible when the board is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the Enano-8523T board.

3.2.1 IDE Connector

CN Label: **IDE1**

CN Type: **2x22 pin header**

CN Location: **See Figure 3-3**

CN Pinouts: **See Table 3-4**

One IDE connector provides connectivity for two IDE devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND

25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-4: IDE Connector Pinouts

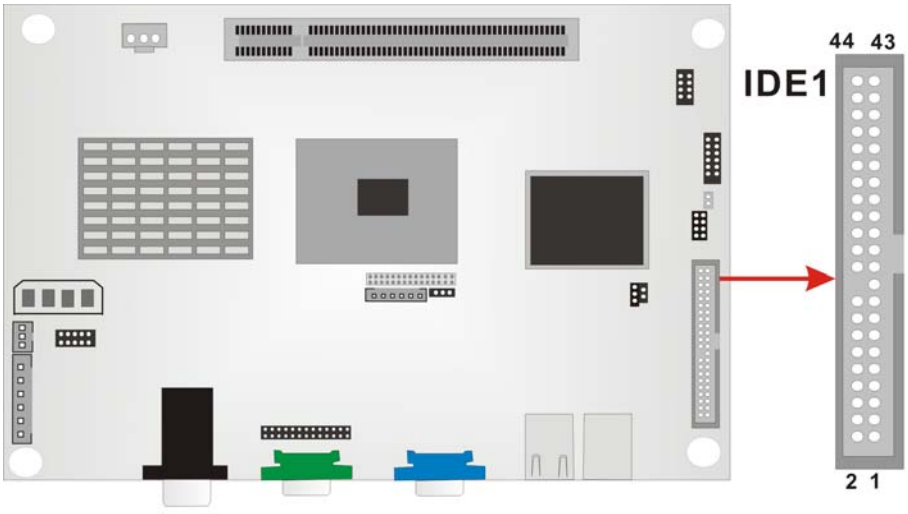


Figure 3-3: IDE Connector Location

3.2.2 DIO Connector

CN Label: **DIO1**

CN Type: **2x5 pin headers**

CN Location: **See Figure 3-4**

CN Pinouts: **See Table 3-5**

The digital input output (DIO) connector is managed through a Winbond W83628G LPC I/O chip. The DIO connector pins are user programmable.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	GPIO0	4	GPIO1
5	GPIO2	6	GPIO3
7	GPIO4	8	GPIO5
9	GPIO6	10	GPIO7

Table 3-5: DIO Connector Pinouts

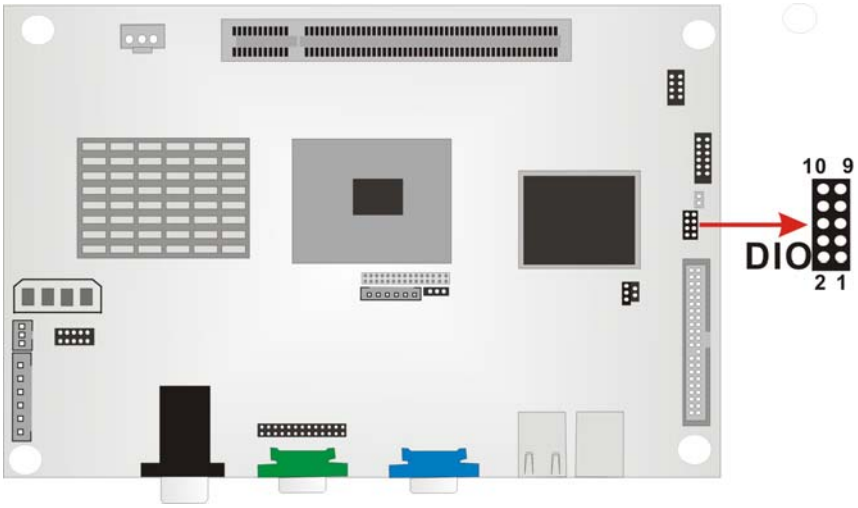


Figure 3-4: DIO Connector Location

3.2.3 Battery Connector

CN Label: **BT1**

CN Type: **1x2 pin header**

CN Location: **See Figure 3-5**

The battery connector is connected to a preinstalled VARTA CR2032 3V battery

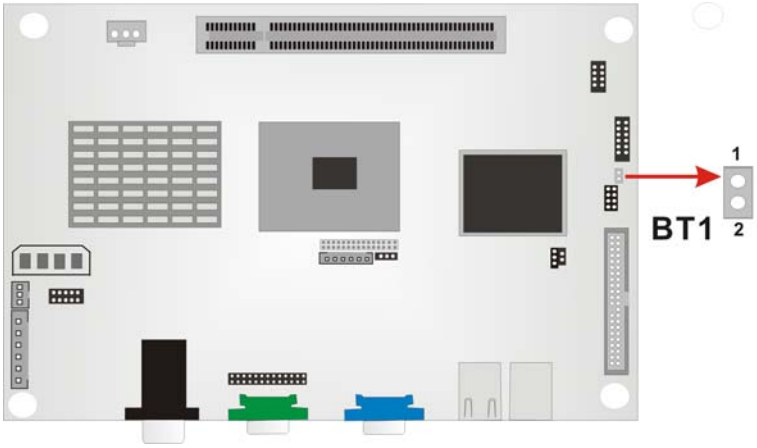


Figure 3-5: Battery Connector Location

3.2.4 Front Panel Connector

CN Label: **CN12**

CN Type: **2x6 pin header**

CN Location: **See Figure 3-6**

CN Pinouts: **See Table 3-6**

The system panel connector connects to:

- the system chassis front panel LEDs
- the chassis speaker
- the power switch
- the reset button.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1-3	POWER LED	2-8	SPEAKER
5-7	PWR BUTTON	10-12	RESET
9-11	HDLED		

Table 3-6: Front Panel Connector Pinouts

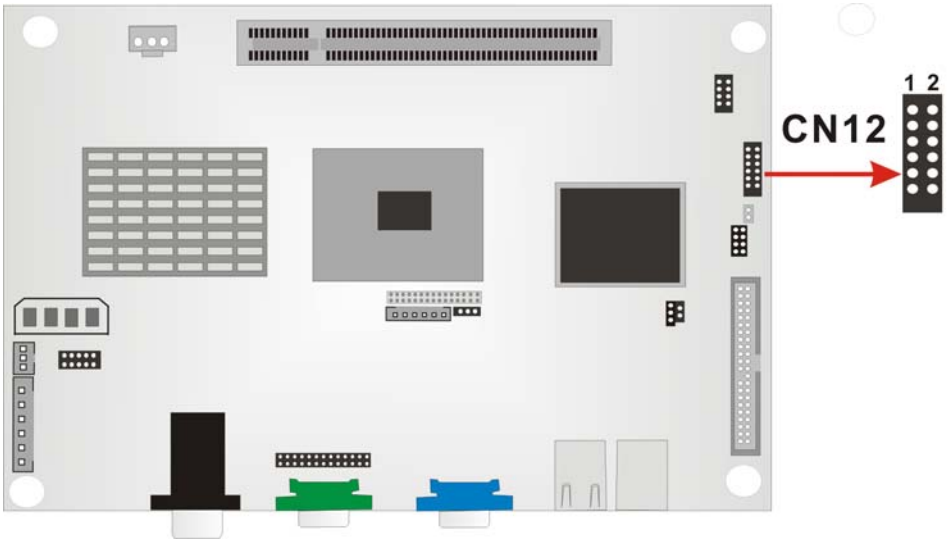


Figure 3-6: Front Panel Connector Location

3.2.5 USB Connector

CN Label: **USB1**

CN Type: **2x8 pin header**

CN Location: **See Figure 3-7**

CN Pinouts: **See Table 3-7**

Two USB devices can be connected directly to the onboard USB connector. The onboard USB connector is USB 2.0 compliant..

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBVCC2	2	USBGND3
3	D2-	4	D3+
5	D2+	6	D3-
7	USBGND2	8	USBVCC3

Table 3-7: USB Connector Pinouts

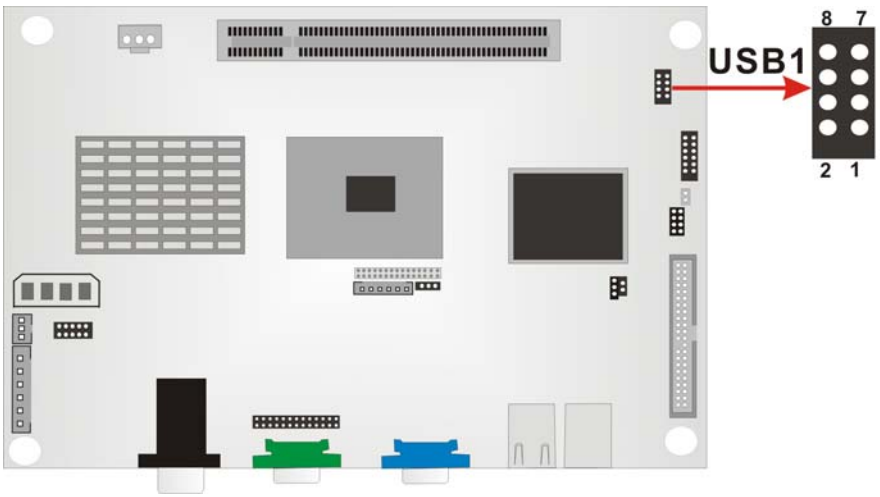


Figure 3-7: USB Connector Location

3.2.6 Fan Connector

CN Label: **FAN1**

CN Type: **1x3 pin header**

CN Location: **See**

CN Pinouts: **See**

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 3-8: FAN1 Pinouts

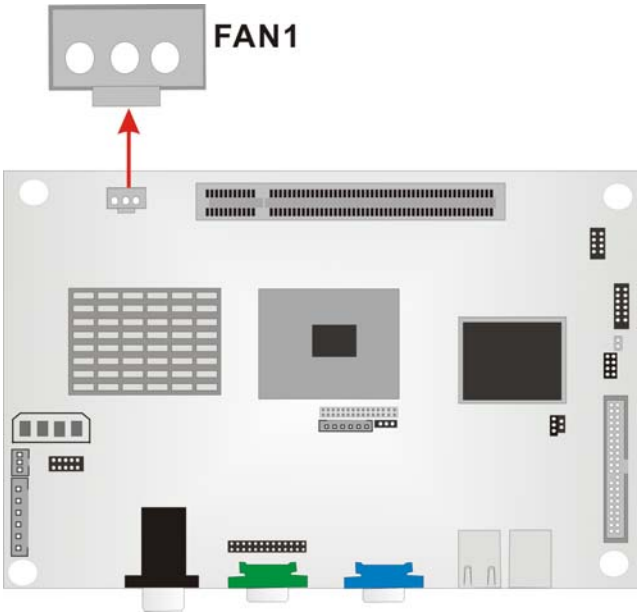


Figure 3-8: Table 3-9: FAN1 Connector Location

3.2.7 ATX Power Connector

CN Label: **PW1**

CN Type: **1x4 pin header**

CN Location: **See Figure 3-9**

CN Pinouts: **See**

Connects a power source from a Enano-8523T to a power supply unit (PSU).

PIN NO.	DESCRIPTION
1	5V
2	GND
3	GND
4	12V

Table 3-10: Power Connector Pinouts

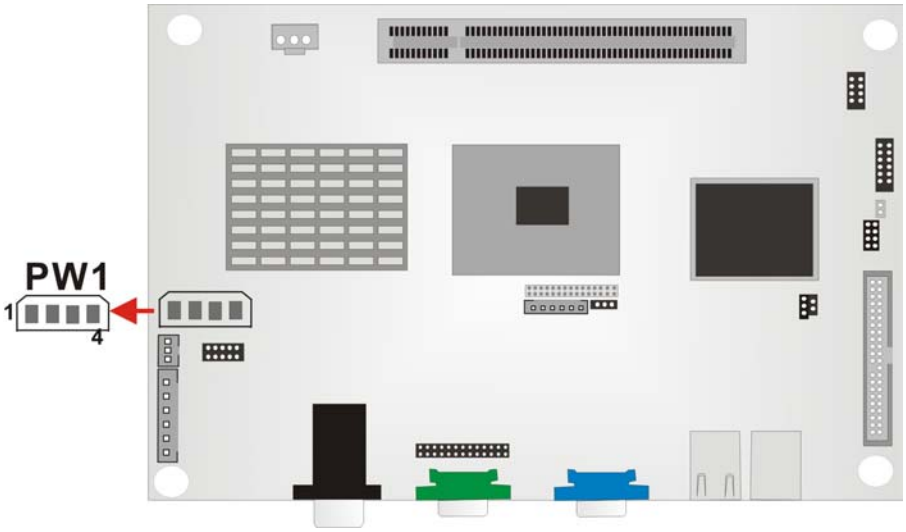


Figure 3-9: Power Connector Location

3.2.8 Power Connector

CN Label: PW2

CN Type: 1x3 pin header

CN Location: See Figure 3-10

CN Pinouts: See Table 3-11

PIN NO.	DESCRIPTION
1	5VSBY
2	GND
3	PSON

Table 3-11: Power Connector Pinouts

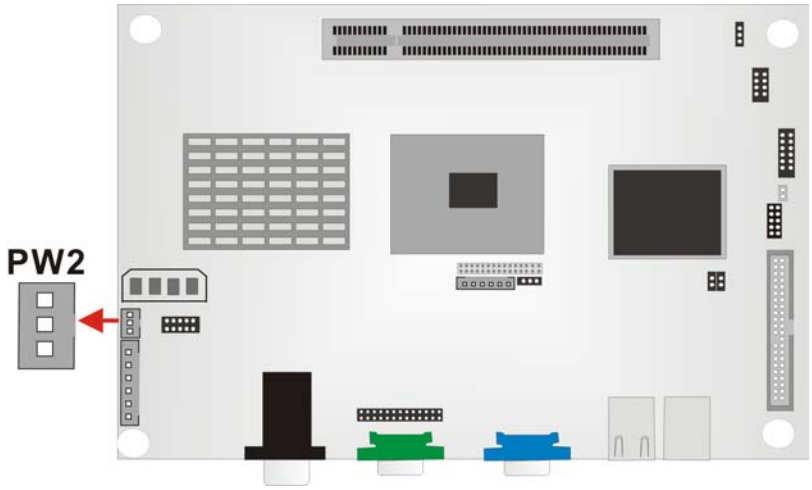


Figure 3-10: Power Connector Location

3.2.9 Keyboard/Mouse Connector

CN Label: **IR1**

CN Type: **1x6 pin header**

CN Location: **See Figure 3-11**

CN Pinouts: **See Table 3-12**

The Keyboard/ PS2 mouse cable that was shipped with the Enano-8523T board is connected to the keyoard/mouse connector.

PIN NO.	DESCRIPTION
1	5V
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GND

Table 3-12: Keyboard/Mouse Connector Pinouts

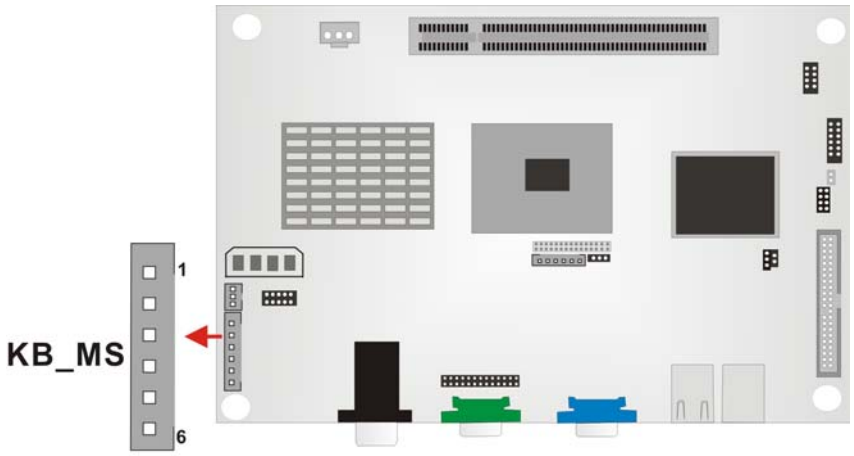


Figure 3-11: Keyboard/Mouse Connector Location

3.2.10 COM4 Connectors

CN Label: **COM4**

CN Type: **1x7 pin port**

CN Location: **See Figure 3-12**

CN Pinouts: **See**

The COM4 connector provides connectivity to RS-232 serial communication devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD4	2	DSR4
3	RX4	4	RTS4
5	TX4	6	CTS4
7	DTR4	8	RI4
9	GND	10	GND

Table 3-13: COM4 Connector Pinouts

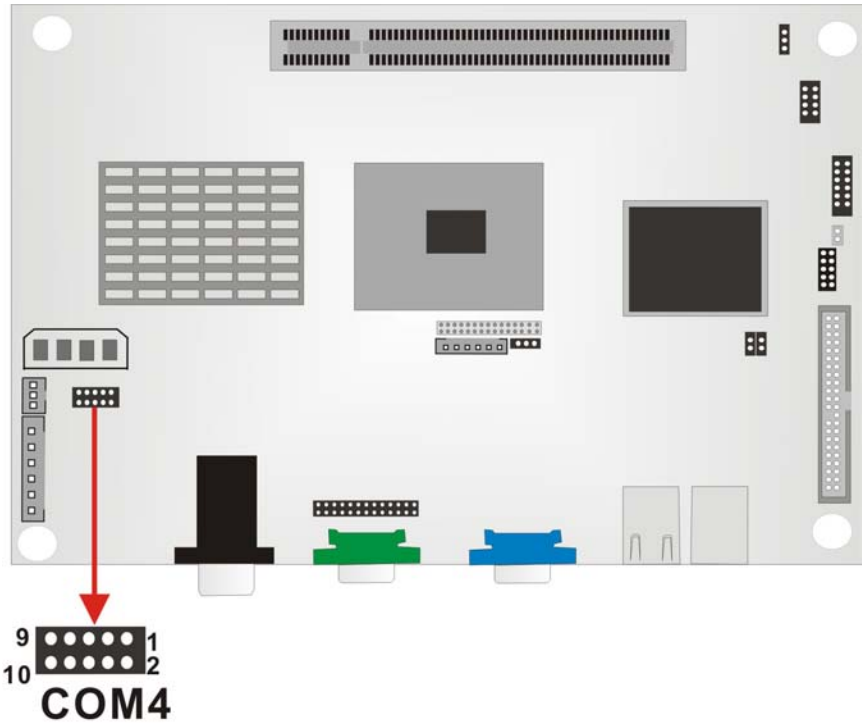


Figure 3-12: COM4 Connector Location

3.2.11 Parallel Port Connector

CN Label: **LPT**

CN Type: **1x5 pin header**

CN Location: **See Figure 3-13**

CN Pinouts: **See Table 3-14**

The parallel port connector is usually connected to a printer. A 26-pin flat-cable connector is used to connect the parallel port with a printer or other parallel communication device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE#
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GND

6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACKNOWLEDGE#	23	GND
11	BUSY	24	GND
12	PAPER EMPTY	25	GND
13	PRINTER SELECT		

Table 3-14: Parallel Port Connector Pinouts

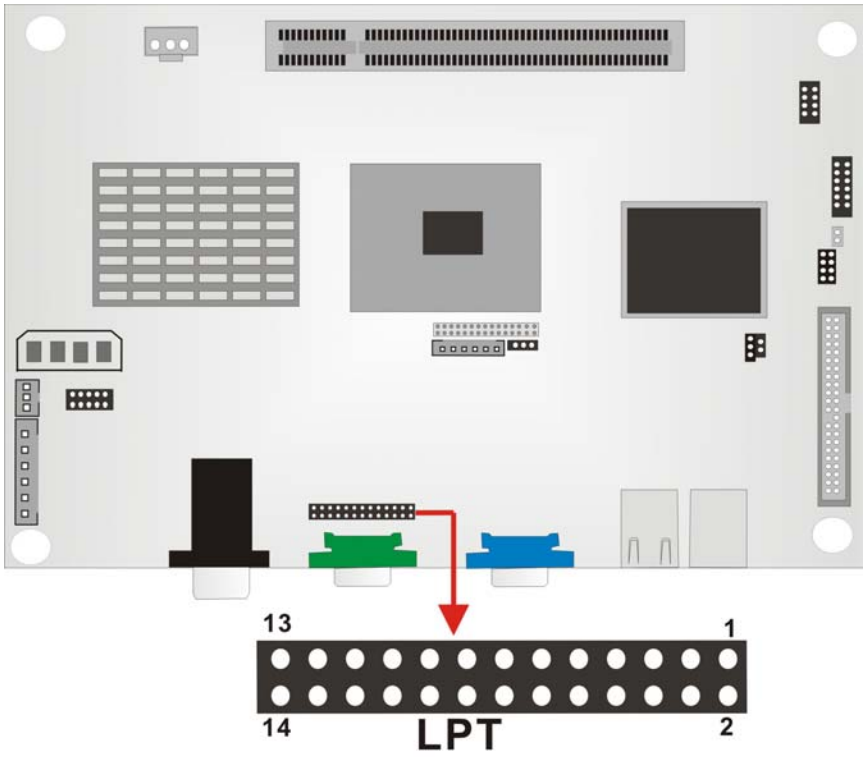


Figure 3-13: Parallel Port Connector Location

3.2.12 Inverter Connector

CN Label: **CN3**

CN Type: **1x6 Pin header**

CN Location: **See Figure 3-14**

CN Pinouts: **See Table 3-15**

The inverter connector connects to the LCD backlight inverter.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC12	2	VCC12
3	BKLT_EN	4	BKLT_ADJ
5	GND	6	GND

Table 3-15: Inverter Connector Pinouts

.

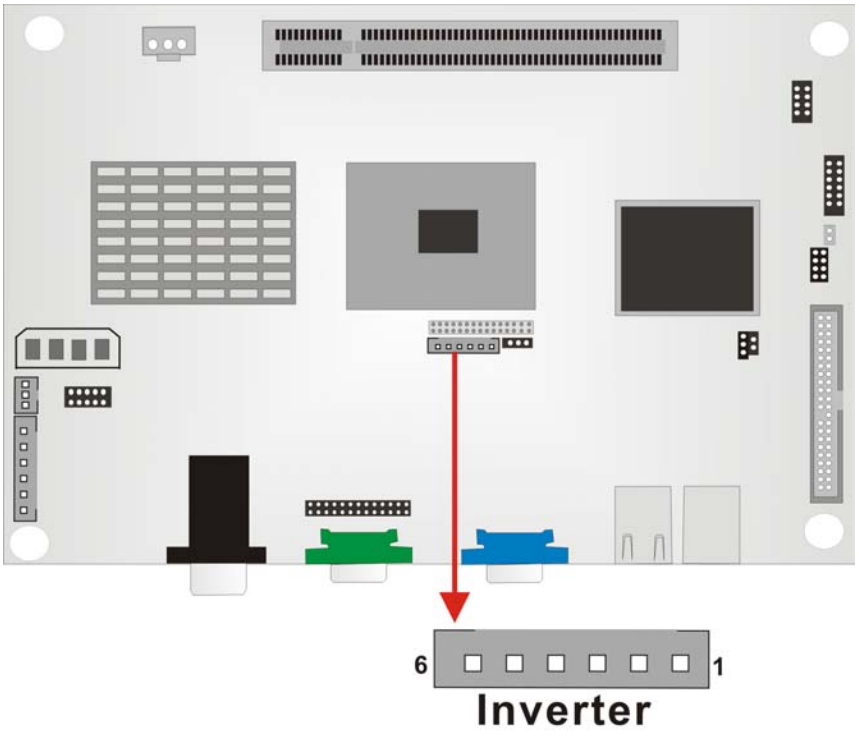


Figure 3-14: Inverter Connector

3.2.13 LVDS Connector

CN Label: **CN8**

CN Type: **2x15 Pin header**

CN Location: **See Figure 3-14**

CN Pinouts: **See Table 3-16**

LVDS (Low Voltage Differential Signaling) is a low noise, low power, and low amplitude method for high-speed data transmission over a copper wire. The LVDS connector is typically connected to an LCD screen.

PIN NO.	Description	PIN NO.	Description
1	GND	2	GND
3	LVDS_Y0+	4	LVDS_Y0-
5	LVDS_Y1+	6	LVDS_Y1-
7	LVDS_Y2+	8	LVDS_Y2-
9	LVDS_CLK+	10	LVDS_CLK-
11	LVDS_Y3+	12	LVDS_Y3-
13	GND	14	GND
15	LVDSB_Y0+	16	LVDSB_Y0-
17	LVDSB_Y1+	18	LVDSB_Y1+
19	LVDSB_Y2+	20	LVDSB_Y2-
21	LVDSBCLK+	22	LVDSBCLK-
23	LVDSB_Y3+	24	LVDSB_Y3-
25	GND	26	GND
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 3-16: LVDS Connector Pinouts

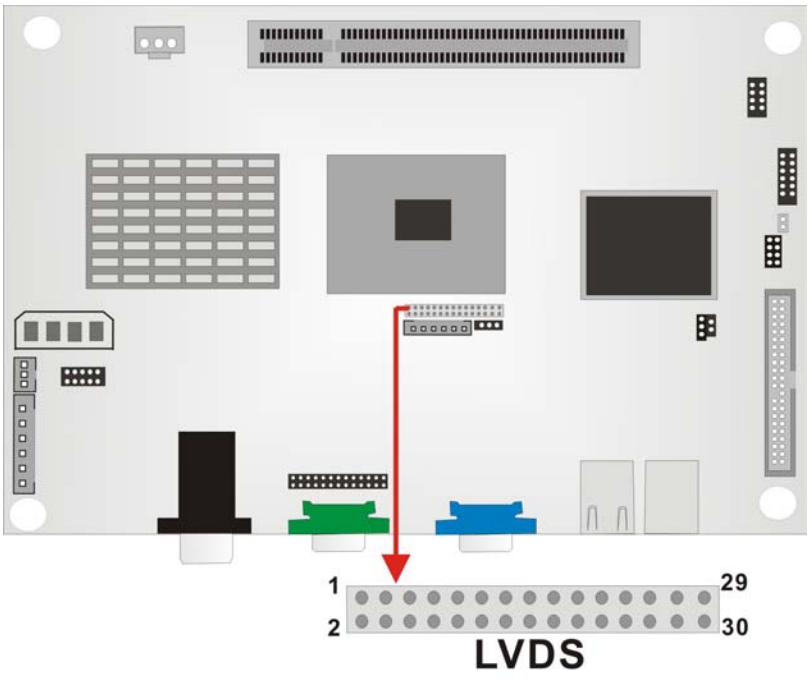


Figure 3-15: LVDS Connector

3.2.14 SODIMM Socket

CN Label: **DIMM1**

CN Type: **200 Pin DDR-SDRAM SODIMM Socket**

CN Location: **See Figure 3-16**

A 200 pin DDR-SDRAM SODIMM socket is located on the rear side of the Enano-8523T board. The SODIMM socket can support 266MHz DDR SODIMM SDRAM of up to 1GB

Figure 3-16: SODIMM Socket Location (Rear Side)

3.2.15 Compact Flash Type 2 Socket

CN Label: **CN7**

CN Type: **50-pin**

CN Location: **See Figure 3-17**

CN Pinouts: **See Table 3-17**

A CFII (compact flash type II connector) is located on the rear side of the Enano-8523T. The CFII connector is for applications without external storage. The Compact Flash socket provides an alternative to hard disk drives in applications where hard disk drives may consume too much space and storage capacity is not a requirement. The CF card behaves like a Secondary IDE Master disk drive.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1

8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-17: CFII Socket Pinouts

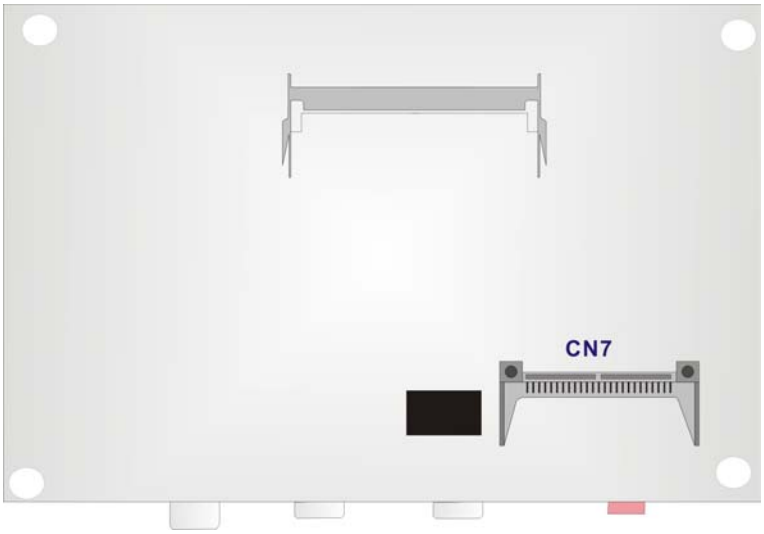


Figure 3-17: CFII Socket Location (Rear Side)

3.3 External (Rear Panel) Connectors

Figure 3-18 shows the Enano-8523T board rear panel. The peripheral connectors on the back panel can be connected to devices externally when the Enano-8523T is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x PS/2 keyboard connector
- 2 x USB connectors
- 1 x RJ-45 GbE connector
- 1 x VGA connector
- 1 x Line-out connector

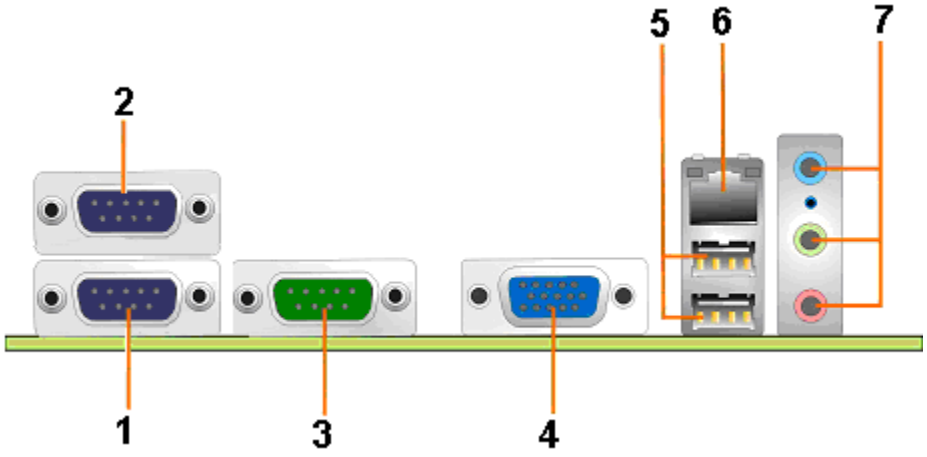


Figure 3-18: Enano-8523T Board Rear Panel

3.3.1 Serial Port Connectors

CN Label: **CN6, J5**

CN Type: **DB-9**

CN Location: **See Figure 3-18 (labeled number 1,2, 3)**

CN Pinouts: **See Table 3-18**

The three serial ports (COM1, COM2 and COM3) can be connected to a serial communications device directly.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	2	DSR1
3	RX1	4	RTS1
5	TX1	6	CTS1
7	DTR1	8	RI1
9	GND		

Table 3-18: Serial Port Pinouts

3.3.2 USB Connectors

CN Label: **J15**

CN Type: **USB port**

CN Location: **See Figure 3-18 (labeled number 5)**

CN Pinouts: **See Table 3-19**

USB devices can be connected directly to the USB connectors on the rear panel.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	DATA-
3	DATA+	4	GND

Table 3-19: USB Connectors

3.3.3 Ethernet Connector

CN Label: **J15**

CN Type: **RJ-45**

CN Location: **See Figure 3-18 (labeled number 6)**

CN Pinouts: **See Table 3-20**

The Ethernet connector can be directly connected to a Local Area Network (LAN) through a network hub. An RJ-45 Ethernet connector is shown in **Figure 3-19**.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXD+	8	GND
2	TXD-	9	GRN+
3	RXD+	10	GRN-
4	CT_TXD	11	YEL-
5	CT_RXD	12	YEL+
6	RXD-	13	S GND
7	N/C	14	S GND

Table 3-20: RJ-45 Ethernet Connector Pinouts

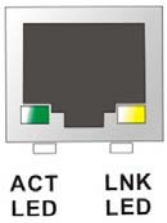


Figure 3-19: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-21**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 3-21: RJ-45 Ethernet Connector LEDs

3.3.4 VGA Connector

CN Label: **VGA1**

CN Type: **15-pin**

CN Location: **See Figure 3-18 (labeled number 4)**

The standard 15-pin VGA connector connects to a CRT or LCD display monitor.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Red	9	No Connect
2	Green	10	Ground
3	Blue	11	No Connect
4	No Connect	12	DDC DAT
5	Ground	13	Horizontal Synchronization
6	Ground	14	Vertical Synchronization
7	Ground	15	DDC Clock
8	Ground		

Table 3-22: VGA Connector Pinouts

3.3.5 Audio Connector

CN Label: **CN11**

CN Type: **3 x audio jacks**

CN Location: **See Figure 3-18 (labeled number 7)**

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

3.4 Onboard Jumpers

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

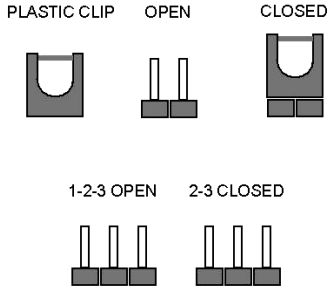


Figure 1-3-20 **Jumper**

The Enano-8523T board has three one onboard jumpers, “Clear CMOS,” “CF card setup” and “LCD voltage setup.”

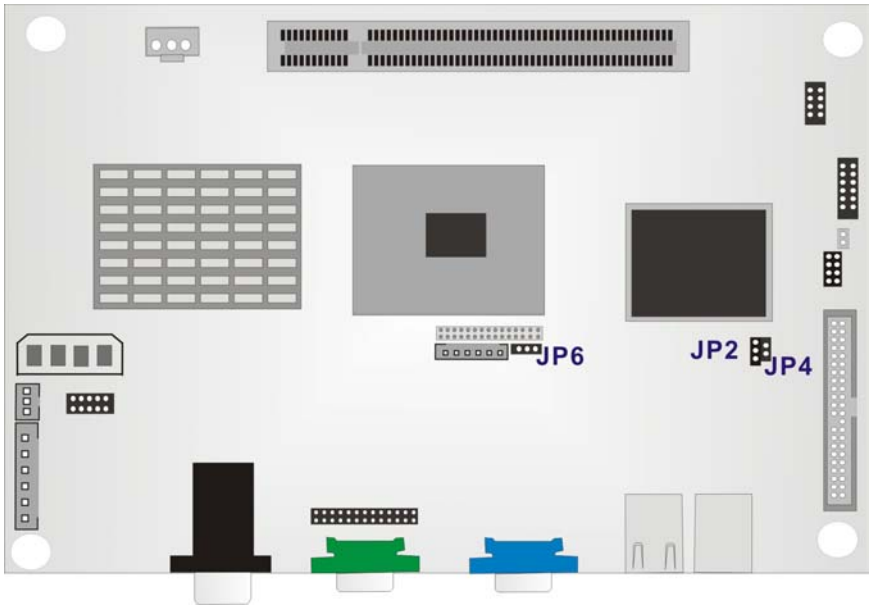


Figure 3-21: Jumper Locations

3.4.1 Reset CMOS Jumper

Jumper Label: **JP2**

Jumper Type: **3 pin header**

Jumper Settings: **See Table 3-23**

Jumper Location: **See Figure 3-21**

If the Enano-8523T fails to boot due to improper BIOS setting, use this jumper to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message displays during the boot up process, you may then try to correct the fault by pressing the F1 to enter the CMOS Setup menu. You may then do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After you have done one of the above, save your changes and exit the CMOS Setup menu.

JJP2	CLEAR CMOS
1-2 closed	Normal (default)
2-3 closed	Clear CMOS

Table 3-23: JP2 Jumper Settings

3.4.2 CF Card Setup

Jumper Label: **JP4**

Jumper Type: **2 pin header**

Jumper Settings: **See Table 3-24**

Jumper Location: **See Figure 3-21**

This allows you to set a compact flash card as either the slave device or the master device.

JP4	DESCRIPTION
Open	Slave(Default)
Close	Master

Table 3-24: JP4 Jumper Settings

3.4.3 LCD Voltage Setup

Jumper Label: **JP6**

Jumper Type: **3 pin header**

Jumper Settings: **See Table 3-25**

Jumper Location: **See Figure 3-21**

This allows you to set the correct voltage for your LCD screen.

WARNING:

Please refer to the technical documentation that came with your LCD panel. If you set the incorrect voltage on this jumper you may cause irreversible damage to both the LCD panel and the Enano-8523T.

JP6	DESCRIPTION
1-2	3.3V(Default)
2-3	5V

Table 3-25: JP6 Jumper Settings

Chapter

4

Installation and Configuration

4.1 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the Enano-8523T is installed. All installation notices pertaining to the installation of the Enano-8523T should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of ENANP-8523 and injury to the person installing the ENANO-853.

4.1.1 Installation Notices

Before and during the installation of the Enano-8523T board, please do the following:

- Read the user manual
  - The user manual provides a complete description of the Enano-8523T board, installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD)
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from your body and help to prevent ESD damage.
- Place the board on an antistatic pad
  - When you are installing or configuring the board, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn off all power to the Enano-8523T board
  - When working with the board, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the Enano-8523T board DO NOT:

- remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- use the product before you have verified that all cables and power connectors are properly connected.

- allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.2 Unpacking

NOTE:

If any of the items listed below are missing when you unpack the Enano-8523T board, do not proceed with the installation and contact the reseller or vendor you purchased the board from.

4.2.1 Unpacking Precautions

Before you install the Enano-8523T board, you must unpack the board. Some Enano-8523T components are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damage, follow these precautions:

- Ground yourself to remove any static charge before touching your Enano-8523T. You can do so by wearing a grounded wrist strap at all times or by frequently touching any conducting materials that are connected to the ground.
- Handle your Enano-8523T by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.2.2 Checklist

When you unpack the Enano-8523T, please make sure that your package contains the following items.

- 1 x Enano-8523T single board computer
- 1 x Keyboard/ PS2 mouse cable

- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x IDE flat cable 44p/44p
- 1 x QIG (quick installation guide)

If one or more of these items are missing, please contact the reseller or vendor you purchased the Enano-8523T board from and do not proceed any further with the installation.

4.3 Enano-8523T Board Installation

WARNING!

1. Never run the Enano-8523Twithout an appropriate heatsink and cooler that can be ordered from IEI Technology or purchased separately.
2. Be sure to use the CPU 12V power connector (CN10007) for the CPU power.

WARNING!

Please note that the installation instructions described in this manual should be carefully followed in order to avoid damage to the Enano-8523T components and injury to you.

WARNING!

When installing electronic components onto the Enano-8523T always take the following anti-static precautions in order to prevent ESD damage to your Enano-8523T and other electronic components like the CPU and DIMM modules

4.3.1 Preinstalled Components

The components listed below are preinstalled on the Enano-8523T.

- CPU (800MHz Intel Celeron M)
- CPU heat sink
- Northbridge heat sink
- Southbridge heat sink

4.3.2 Components to Install

To install the Enano-8523T, the following components must be installed or connected to the Enano-8523T

- DIMM modules
- Compact flash device
- Peripheral devices

4.3.3 DIMM Module Installation

4.3.3.1 Purchasing the Memory Module

WARNING!

The DDR2 architecture is not compatible with DDR1 modules. If your system is installed with DDR1 modules, damage might occur and your may become inaccessible

When you purchase your SODIMM modules, the following considerations should be taken into account:

- The maximum SODIMM capacity supported in 1GB
- The maximum SODIMM frequency supported is 266MHz.
- The SODIMM chip must be a 200-pin memory chip

4.3.3.2 DIMM Module Installation

The Enano-8523T board has one 200-pin SODIMM socket. To install the SODIMM module, follow the instructions below.

Step 1: Turn the Enano-8523T over so that the SODIMM socket is facing up.

Step 2: Push the SODIMM chip into the socket at an angle.

Step 3: Gently pull the arms of the SODIMM socket out and push the rear of the SODIMM module down.

Step 4: Release the arms on the SODIMM socket. They clip into place and secure the SODIMM module in the socket.

4.3.4 Peripheral Device Connection

Cables provided by IEI that connect peripheral devices to the board are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	Keyboard/ PS2 mouse cable
2	IDE flat cable 44p/44p

Table 4-1: IEI Provided Cables

4.3.4.1 IDE Disk Drive Connector (IDE1)

The cable used to connect the Enano-8523T to the IDE HDD is a standard 44-pin ATA 66/100 flat cable. To connect an IDE device to the Enano-8523T, follow the instructions below.

Step 1: Find the ATA 66/100 flat cable in the kit that came with the Enano-8523T.

Step 2: Connect one end of the cable to the IDE1 connector on the Enano-8523T. A keyed pin on the IDE connectors prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the IDE device making sure that the pin 1 cable corresponds to pin 1 on the connector.

NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.3.4.2 Keyboard/Mouse Connection

The cable used to connect the Enano-8523T to the keyboard and mouse is Y-cable that is connected to KB_MS1. To connect a keyboard and mouse, please do the following.

Step 1: Insert the connector at the end of the keyboard/mouse cable in the keyboard/mouse connector on the Enano-8523T.

Step 2: Connect the respective cables to the keyboard and mouse.

4.4 Chassis Installation

After the CPU, the cooling kit, and the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configure, the Enano-8523T can be mounted into chassis.

To mount a board into a chassis, please refer to the chassis user guide that came with the product.

4.5 Rear Panel Connectors

4.5.1 LCD Panel Connection

The conventional CRT monitor connector, VGA1, is a 15-pin, female D-SUB connector. Pin assignments can be seen in that can be connected to external monitors.

4.5.2 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 100M/s.

4.5.3 USB Connection

The rear panel USB connectors provide easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

Chapter

5

AMI BIOS Setup

5.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options you may change.

5.1.1 Starting Setup

The AMI BIOS is activated when you turn on the computer. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before you respond, you must restart your computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PageUp and PageDown keys to change entries, press F1 for help and press ESC to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When you press F1 a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press ESC or the F1 key again.

5.1.4 Unable to Reboot After Configuration Changes

If you are unable to boot your computer after you have made changes to the system configuration, you must restore the CMOS defaults. Use the jumper described in Chapter **Chapter 3**, **Section 3.4.1**.

5.1.5 BIOS Menu Bar

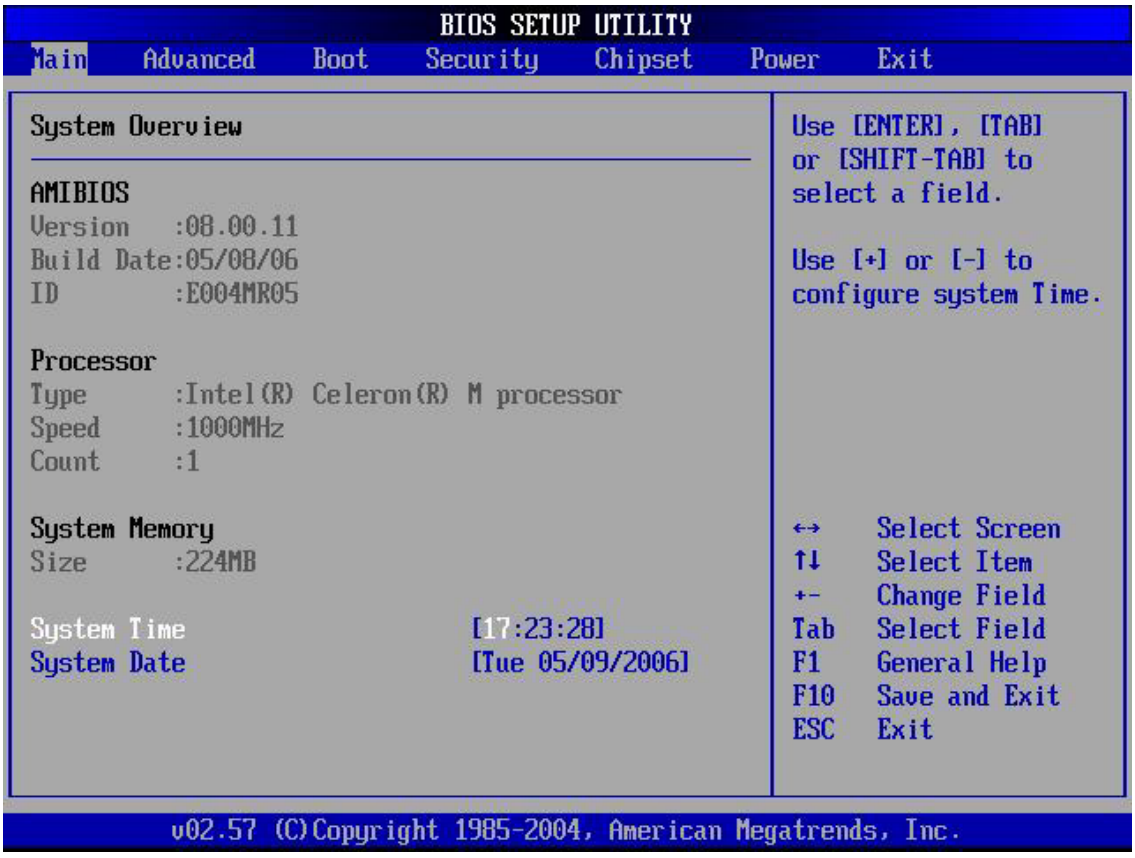
The menu bar on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

When you enter the **BIOS Setup** program, the **Main** menu (**BIOS Menu 1**) appears. The **Main** menu gives you an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The System Overview lists a brief summary of different system components. The fields in System Overview cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID

- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed
  - **Count**: The number of CPUs on the Enano-8523T

- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The **System Overview** field also has two user configurable fields:

- **System Time [xx:xx:xx]**: Allows you to set the system time.
- **System Date [Day xx/xx/xxxx]:** Allows you to set the system date.

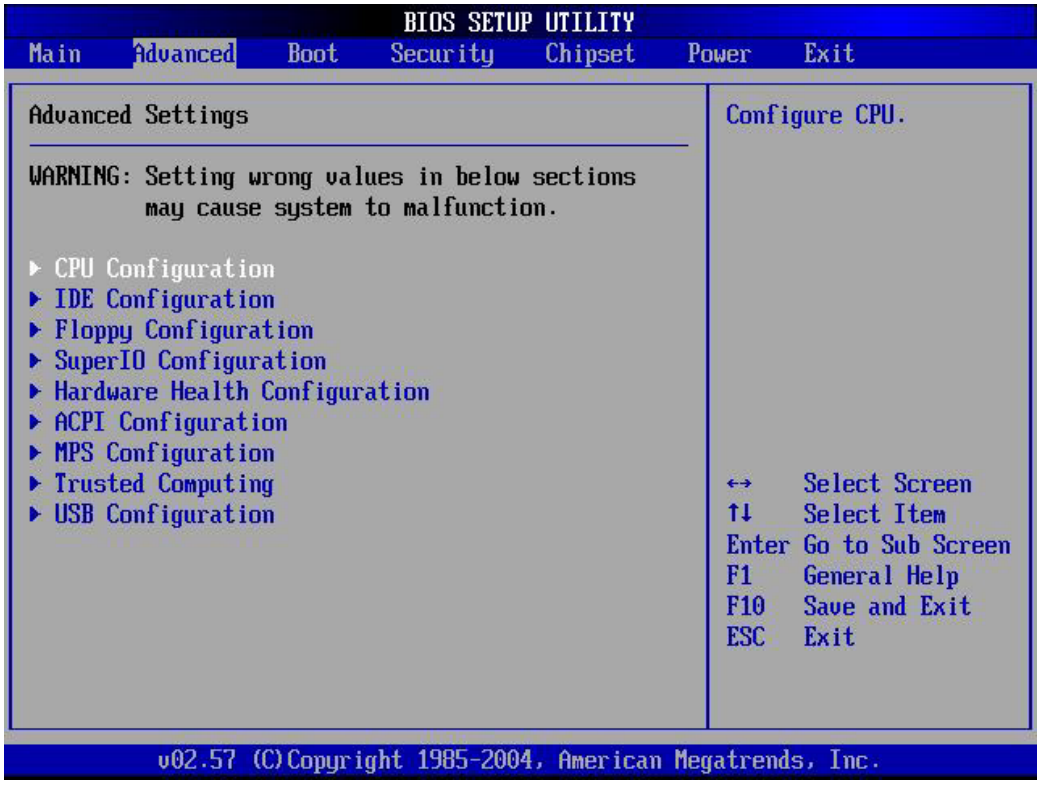
5.3 Advanced

The **Advanced** menu (**BIOS Menu 2**) allows you to access CPU and peripheral device configuration options through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings you make are compatible with your hardware.

- **CPU Configuration** (see **Section 0**)
- **IDE Configuration** (see **Section 5.3.2**)
- **SuperIO Configuration** (see **Section 5.3.3**)
- **Hardware Health Configuration** (see **Section 5.3.4**)
- **ACPI Configuration** (see **Section 5.3.5**)
- **MPS Configuration** (see **Section 5.3.6**)
- **Trusted Computing** (see **Section 5.3.7**)
- **USB Configuration** (see **Section 5.3.8**)



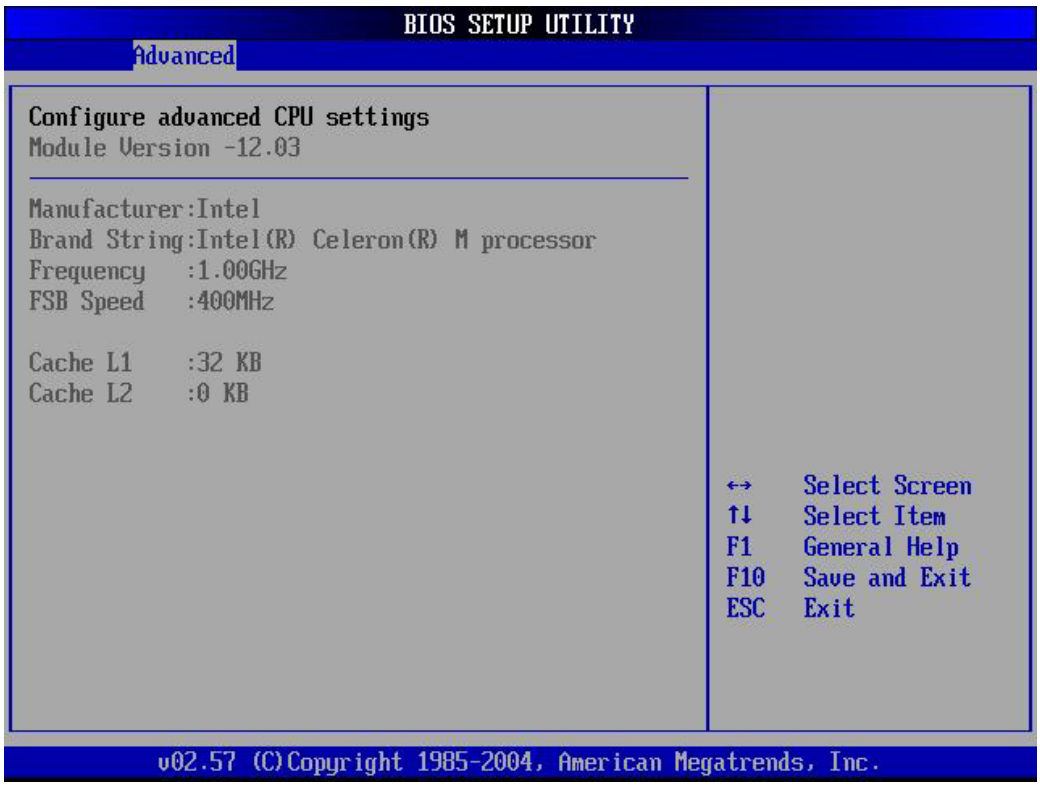
BIOS Menu 2: Advanced

NOTE:

The floppy configuration function shown in the menu above is not available on the Enano-8523T.

5.3.1 CPU Configuration

The **CPU Configuration** menu (**BIOS Menu 3**) shows detailed CPU specifications.



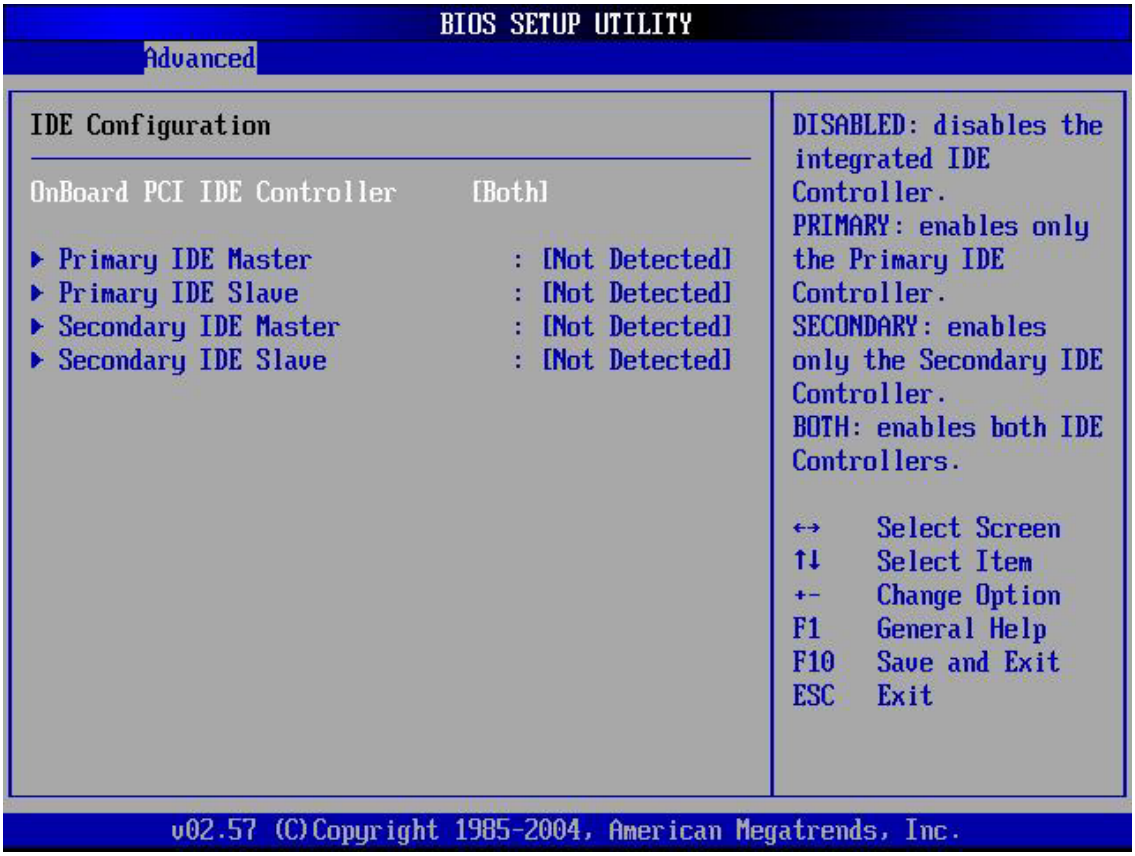
BIOS Menu 3: CPU Configuration [Advanced]

The **CPU Configuration** menu (**BIOS Menu 3**) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Brand String**: Lists the brand name of the CPU being used
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size (which in this case is zero)

5.3.2 IDE Configuration

The **IDE Configuration** menu (**BIOS Menu 4**) allows you to set or change the configurations for the IDE devices installed in the system.


BIOS SETUP UTILITY
Advanced
IDE Configuration
OnBoard PCI IDE Controller [Both]
Primary IDE Master : [Not Detected]
Primary IDE Slave : [Not Detected]
Secondary IDE Master : [Not Detected]
Secondary IDE Slave : [Not Detected]
DISABLED: disables the integrated IDE Controller.
PRIMARY: enables only the Primary IDE Controller.
SECONDARY: enables only the Secondary IDE Controller.
BOTH: enables both IDE Controllers.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 4: IDE Configuration [Advanced]

➔ **OnBoard PCI IDE Controller [Both]**

The OnBoard PCI IDE Controller BIOS option specifies the IDE channels used by the onboard PCI IDE controller. The following configuration options are available.

➔ **Disabled** Prevents the system from using the onboard IDE controller

➔ **Primary** Only allows the system to detect the Primary IDE channel, including both the Primary Master and Primary Slave)

➔ **Secondary** Only allows the system to detect the Secondary IDE channel, including both the Secondary Master and

Secondary Slave)

➔ **Both** (Default) Allows the system to detect both the Primary and Secondary IDE channels including the Primary Master, Primary Slave, Secondary Master and Secondary Slave.

➔ **IDE Master and IDE Slave**

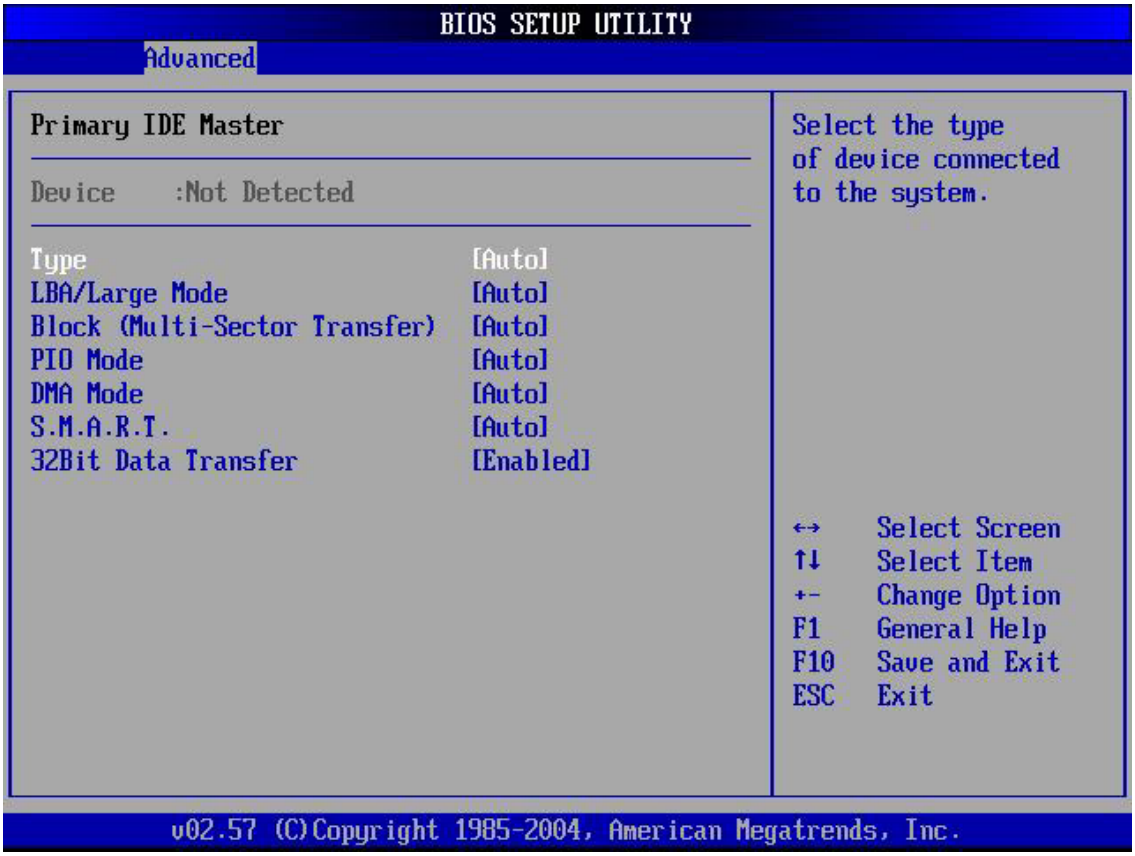
When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the IDE Configuration menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave
- Third IDE Master
- Third IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows you to set or change the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

5.3.2.1 IDE Master, IDE Slave

IDE Master and IDE Slave configuration options for both primary and secondary IDE devices are shown in the BIOS menu below.



BIOS Menu 5: IDE Master and IDE Slave Configuration [Advanced/IDE Configuration]

➔ **Auto-Detected Drive Parameters**

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Vendor**: Lists the device manufacturer
- **Size**: The size of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB

per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.

➔ **Type [Auto]**

The Type BIOS option determines the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.

➔	**Not Installed**		Selecting this value prevents the BIOS from searching for an IDE disk drive on the specified channel.
➔	**Auto**	(Default)	This selection enables the BIOS to auto detect the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔	**CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.
➔	**ARMD**		This option specifies an ATAPI Removable Media Device. These include, but are not limited to: ➔ **ZIP** ➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

The LBA/Large Mode BIOS option allows you to disable or auto detect LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

- **Disabled** This selection prevents the BIOS from using the LBA mode control on the specified channel.
- **Auto** (Default) This option allows the BIOS to auto detect the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

- **Disabled** Selecting this option prevents the BIOS from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
- **Auto** (Default) Selecting this value to allows the BIOS to auto detect the device support for Multi-Sector Transfers on the specified channel. If supported. Select this value to allow the BIOS to auto detect the number of sectors per block for transfer from the hard disk drive to the memory. The data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

The PIO Mode option allows you to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

- **Auto** (Default) This setting allows the BIOS to auto detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.
- **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps

- ➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- ➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- ➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

(This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

The DMA Mode BIOS selection allows you to you to adjust the DMA mode options.

- ➔ **Auto** (Default) The BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- ➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- ➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- ➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- ➔ **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- ➔ **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- ➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer

rate of 25MBps

- **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures. The S.M.A.R.T BIOS option allows you to enable or disable this function.

- **Auto** (Default) BIOS to auto detects if the hard disk drive supports S.M.A.R.T. Use this setting if the IDE disk drive support cannot be determined.
- **Disabled** Select this value to prevent the BIOS from using the SMART feature.
- **Enabled** Select this value to allow the BIOS to use the SMART feature on support hard disk drives.

➔ **32Bit Data Transfer [Enabled]**

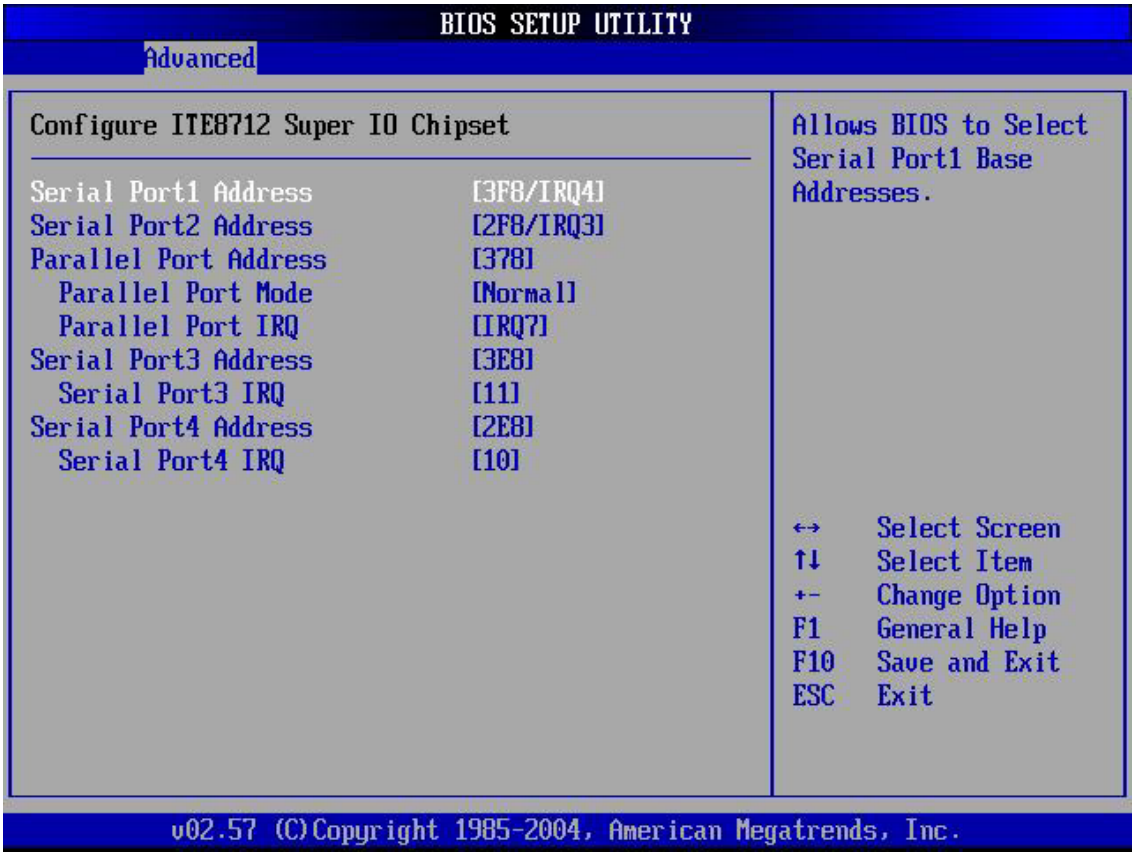
The 32Bit Data Transfer BIOS option allows you to enable or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** (Default) Allows BIOS to use 32-bit data transfers on support hard disk drives.

5.3.3 Super IO Configuration

The **Super IO Configuration** menu (**BIOS Menu 6**) allows you to set or change the configurations for the parallel ports and serial ports.



BIOS Menu 6: Super IO Configuration [Advanced]

➔ **Serial Port1 Address [3F8/IRQ4]**

The Serial Port1 Address option allows BIOS to select the Serial Port 1 base address.

- **Disabled** No base address is assigned to Serial Port 1
- **3F8/IRQ4** (Default) Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

The Serial Port2 Address option allows BIOS to select the Serial Port 2 base address.

- **Disabled** No base address is assigned to Serial Port 2
- **2F8/IRQ3** (Default) Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
- **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
- **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

This option allows BIOS to select the base addresses for Serial Port 2

- **Disabled** No base address is assigned to Serial Port 2
- **2F8/IRQ3** (Default) Serial Port 2 base address is 2F8/IRQ3
- **3E8/IRQ4** Serial Port 2 base address is 2F8/IRQ3
- **2E8/IRQ3** Serial Port 2 base address is 2F8/IRQ3

➔ **Parallel Port Address [378]**

This option allows BIOS to select the base addresses for the Parallel Port

➔ **Disabled**		No base address is assigned to the Parallel Port
➔ **378**	(Default)	Parallel Port I/O port address is 378
➔ **278**		Parallel Port I/O port address is 278
➔ **3BC**		Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

The Parallel Port Mode selection allows you to select the mode the parallel port operates in.

➔ **Normal**	(DEFAULT)	The normal parallel port mode is the standard mode for parallel port operation.
EPP		The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.
➔ **ECP**		The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
➔ **ECP+EPP**		The parallel port operates in the extended

capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

The parallel port becomes compatible with EPP devices described above

➔ **Parallel Port IRQ [IRQ7]**

The Parallel Port IRQ selection allows you to set the parallel port interrupt address.

- ➔ **IRQ5** IRQ5 is assigned as the parallel port interrupt address
- ➔ **IRQ7** (DEFAULT) IRQ7 is assigned as the parallel port interrupt address

➔ **Serial Port3 Address [3E8]**

This option allows BIOS to select the base addresses for Serial Port 3

- ➔ **Disabled** No base address is assigned to Serial Port 3
- ➔ **2E8** (Default) Serial Port 3 base address is 2E8
- ➔ **2F0** Serial Port 3 base address is 2F0
- ➔ **2E0** Serial Port 3 base address is 2E0

➔ **Serial Port3 IRQ [11]**

The Serial Port3 IRQ selection allows you to set the serial port 3 interrupt address

- ➔ **10** 10 is assigned as the serial port 3 interrupt address
- ➔ **11** (DEFAULT) 11 is assigned as the serial port 3 interrupt address

➔ **Serial Port4 Address [2E8]**

This option allows BIOS to select the base addresses for Serial Port 4

- ➔ **Disabled** No base address is assigned to Serial Port 4
- ➔ **3E8** (DEFAULT) Serial Port 4 base address is 3E8
- ➔ **2E8** Serial Port 4 base address is 2E8
- ➔ **2F0** Serial Port 4 base address is 2F0
- ➔ **2E0** Serial Port 4 base address is 2E0

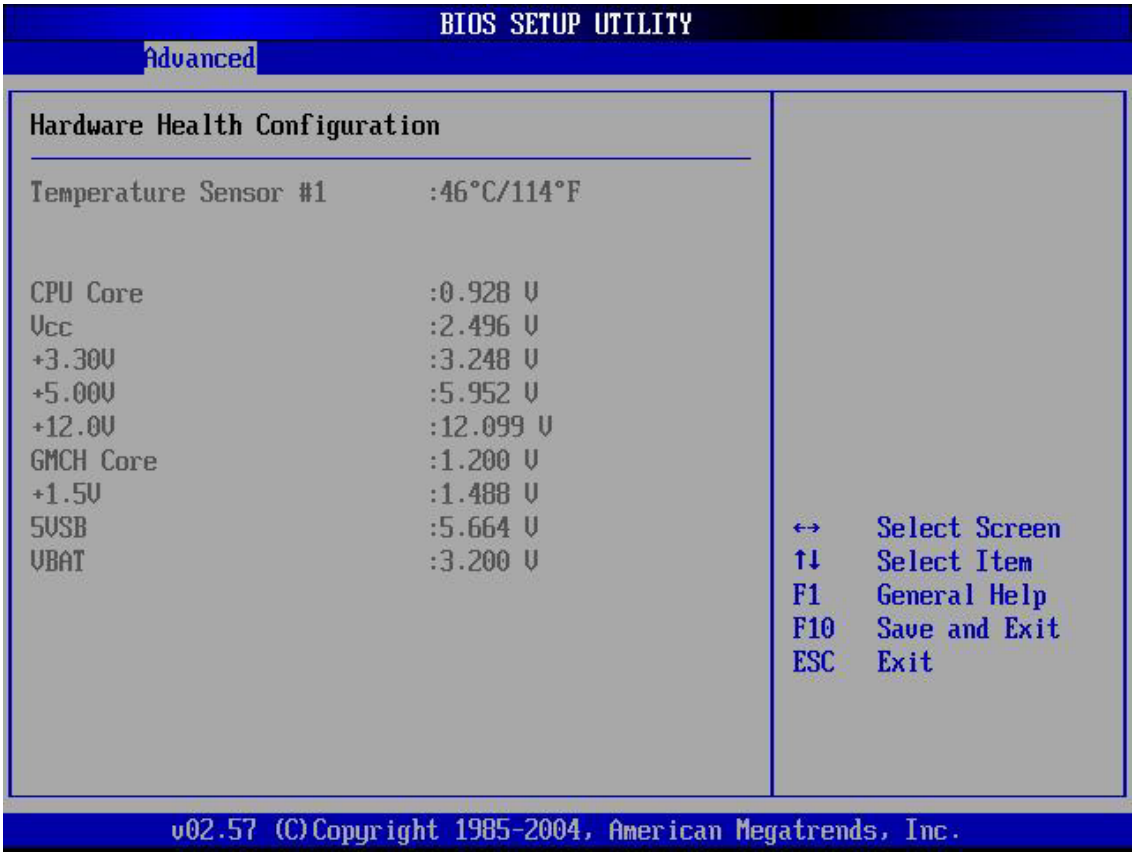
➔ **Serial Port4 IRQ [10]**

The Serial Port4 IRQ selection allows you to set the serial port 4 interrupt address

- ➔ **10** (DEFAULT) 10 is assigned as the serial port 4 interrupt address
- ➔ **11** 11 is assigned as the serial port 4 interrupt address

5.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) allows you to see the configuration for the H/W Health Function and shows you the operating temperature and system voltages.



BIOS Menu 7: Hardware Health Configuration [Advanced]

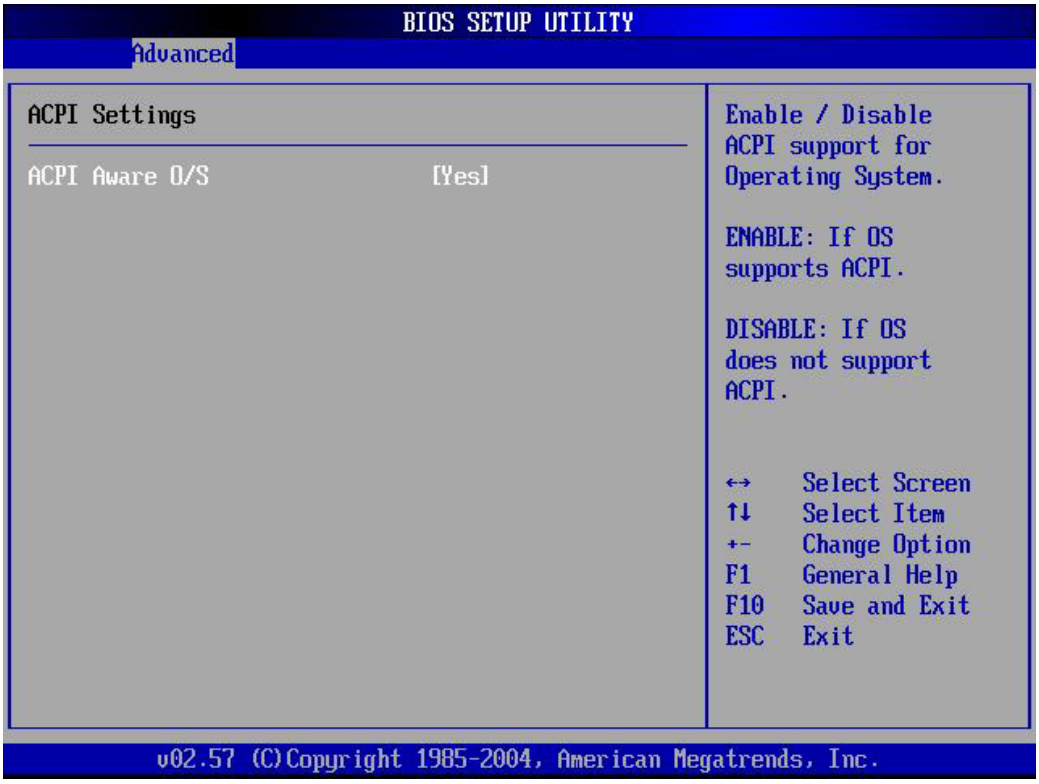
The following hardware health parameters are monitored.

- **System Temperatures**: The following system temperatures are monitored
  - Temperature Sensor #1

- **Voltages**: The following system voltages are monitored
  - Vcore
  - Vcc
  - +3.30Vin
  - +5.00Vin
  - +12.00Vin
  - GMCH core
  - +1.5V
  - 5VSB
  - VBAT

5.3.5 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 8**) allows you to configure the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 8: ACPI Configuration [Advanced]

➔ **ACPI Aware O/S [Yes]**

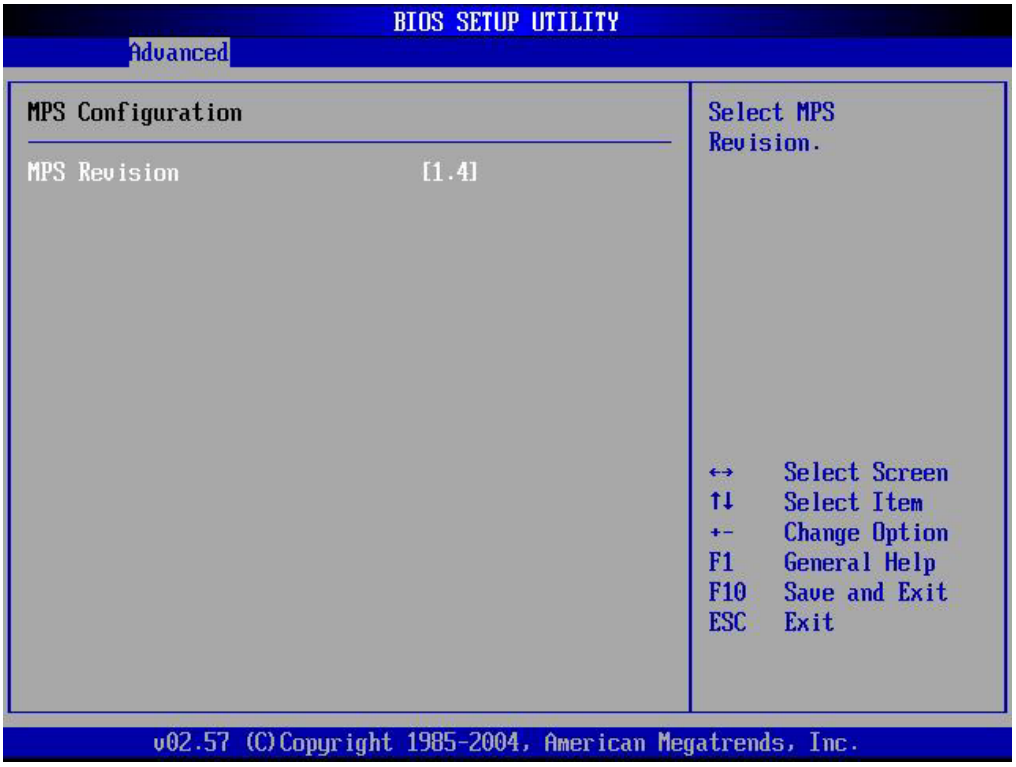
ACPI Aware O/S can only be configured if your OS complies with the ACPI standard. Windows 98, Windows 2000, and Windows XP all comply with ACPI.

➔ **No** Disables the ACPI support for the OS. This selection should be disabled if the OS does not support ACPI

➔ **Yes** (Default) Enables the ACPI support for the operating system. This selection should be enabled if the OS does support ACPI

5.3.6 MPS Configuration

The MPS Configuration menu (**BIOS Menu 9**) allows you to configure the multi-processor table.



BIOS Menu 9: MPS Configuration [Advanced]

➔ **MPS Revision [1.4]**

The Multiprocessor Specification (MPS) for OS specifies the MPS version to be used.

➔ **1.1** MPS version 1.1 is used

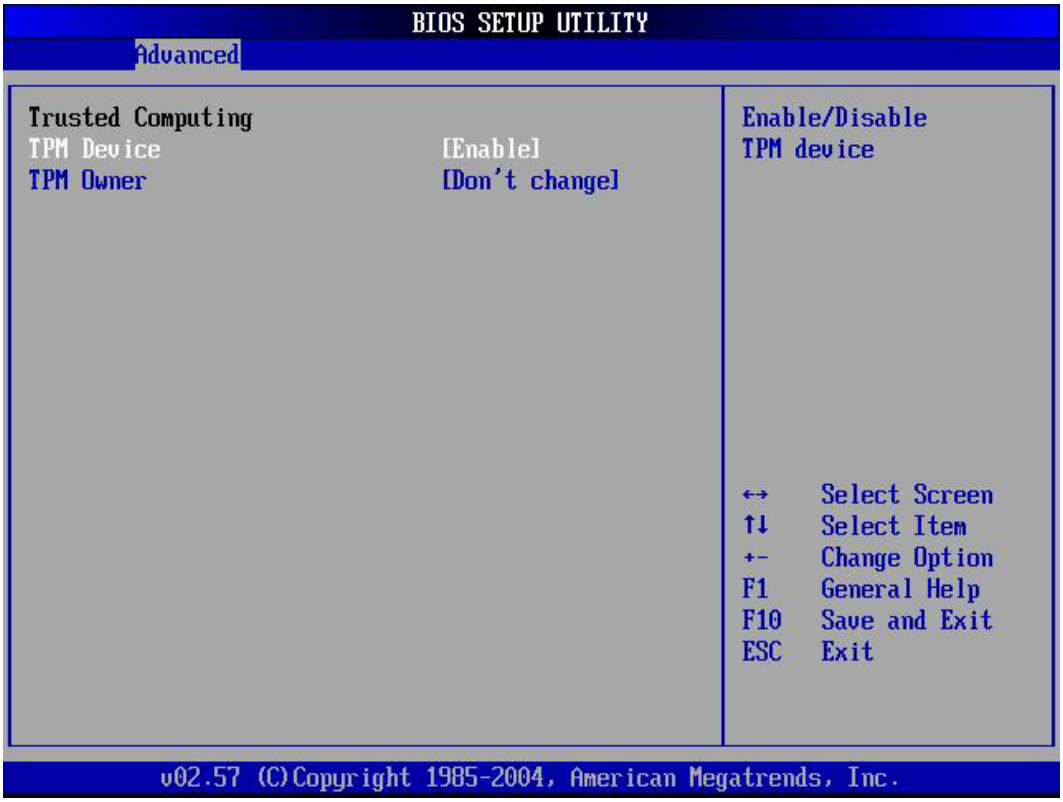
➔ **1.4** (Default) MPS version 1.4 is used

5.3.7 Trusted Computing

NOTE:

For the BIOS trusted computing functions to be effective, the TPM driver that came with the onboard TPM device must be loaded first.

The **Trusted Computing** configuration menu (**BIOS Menu 10**) allows you to initiate the trusted computing option.



BIOS Menu 10: Trusted Computing [Advanced]

➔ **TPM Device [Disabled]**

The **TPM Device** BIOS option allows you to set enable or disable the TPM security device.

➔ **Enabled** (Default) The BIOS loads the vendor specific TPM driver, records

information that verifies the integrity of the BIOS and pre-boot process, and provides a runtime software interface to the TPM. Software at the operating system level uses data in the TPM for trusted applications.

➔ **Disabled** The TPM device is disabled and remains disabled until the computer is restarted and this BIOS option is enabled.

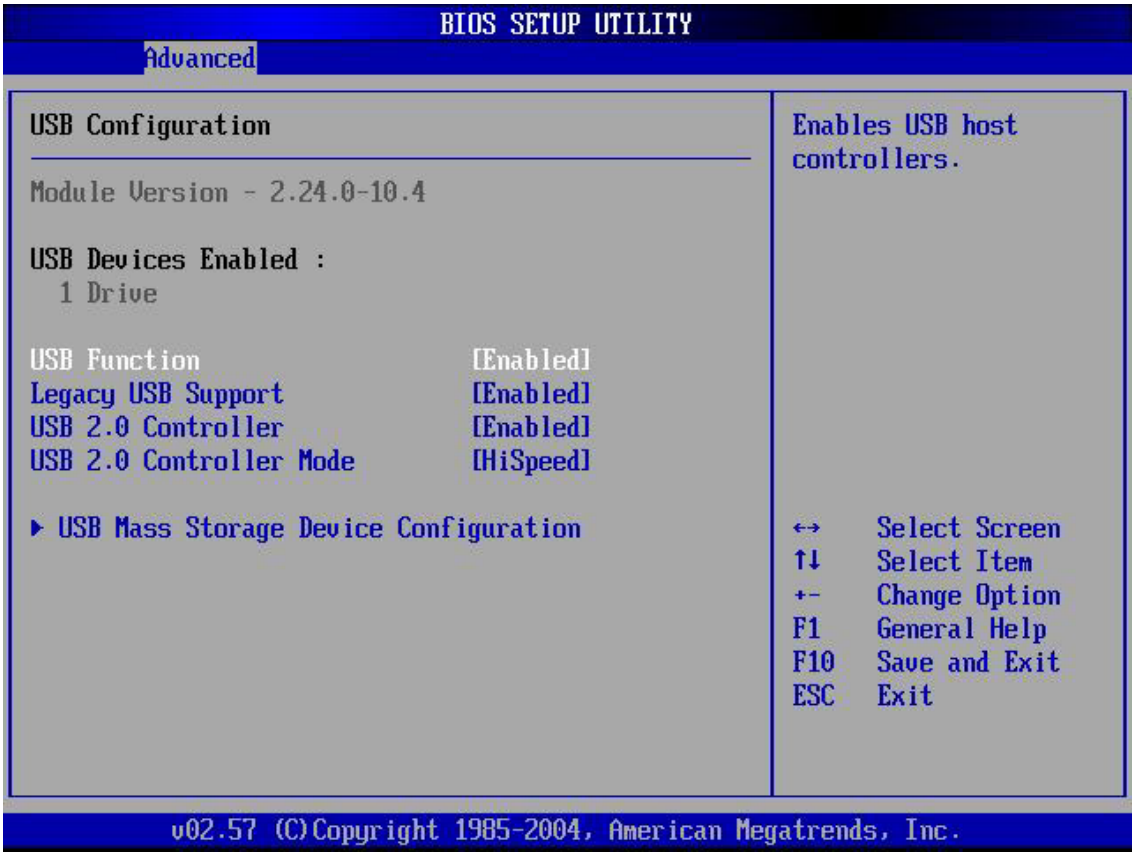
➔ **TPM Owner [Don't Change]**

➔ **Don't Change** (Default)

➔ **Clear**

5.3.8 USB Configuration

The **USB Configuration** menu (**BIOS Menu 11**) gives you information on the USB configuration and allows you to configure some USB features.



BIOS Menu 11: USB Configuration [Advanced]

➔ **USB Configuration**

The USB Configuration field shows the system USB configuration. The items listed are:

- Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled:**

Lists the USB devices that are enabled on the system.

➔ **USB Function [Enabled]**

The **USB Function** BIOS option allows you to enable or disable the USB function

➔ **Disabled** USB function disabled

➔ **Enabled** (Default) USB function enabled

➔ **Legacy USB Support [Disabled]**

The **Legacy USB Support** BIOS option refers to USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded on the system.

➔ **Disabled** (Default) Legacy USB support disabled

➔ **Enabled** Legacy USB support enabled

➔ **USB 2.0 Controller [Enabled]**

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

➔ **Disabled** USB function disabled

➔ **Enabled** (Default) USB function enabled

➔ **USB2.0 Controller Mode [HiSpeed]**

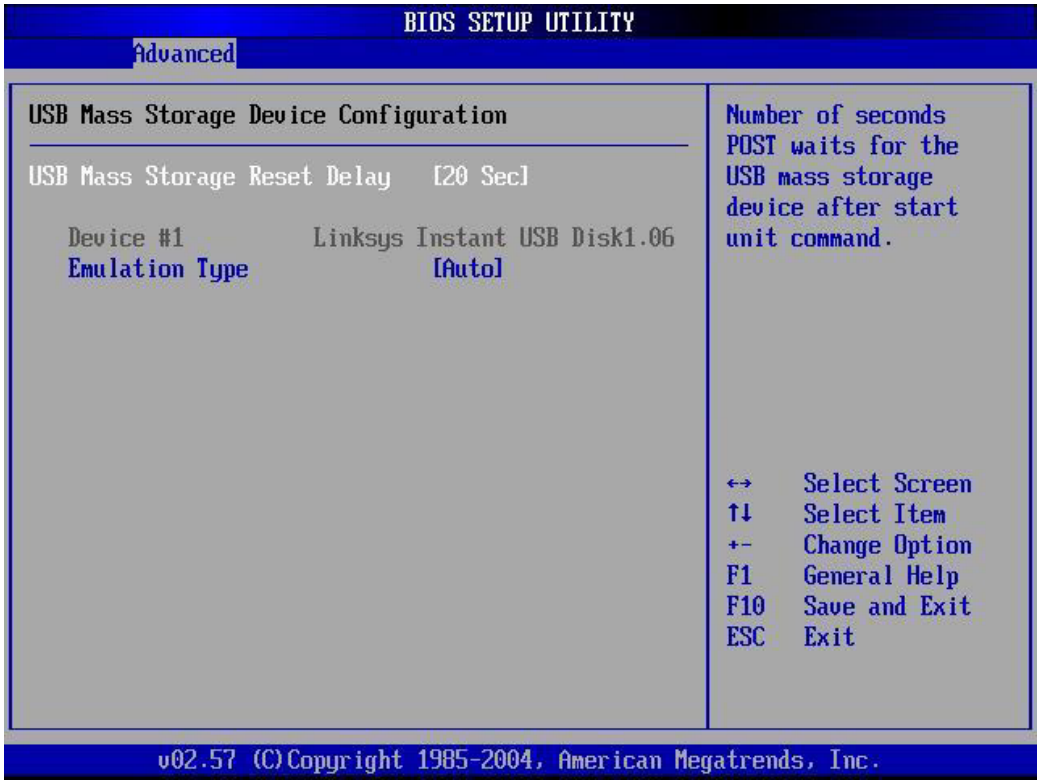
The **USB2.0 Controller Mode** BIOS option allows you to set the speed of the USB2.0 controller.

➔ **FullSpeed** The controller is capable of operating at full speed (12Mbits/second)

➔ **HiSpeed** (Default) The controller is capable of operating at high speed (480Mbits/second)

➔ **USB Mass Storage Device Configuration**

The **USB Mass Storage Device Configuration** field appears if a USB drive is connected to one of the USB ports or connectors. If this option is selected a menu appears.


BIOS SETUP UTILITY
Advanced
USB Mass Storage Device Configuration
USB Mass Storage Reset Delay [20 Sec]
Device #1 Linksys Instant USB Disk1.06
Emulation Type [Auto]
Number of seconds POST waits for the USB mass storage device after start unit command.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 12: USB Mass Storage Device

➔ **USB Mass Storage Delay [20 sec]**

The **USB Mass Storage Delay** BIOS option allows you to set number of seconds the POST waits for the USB mass storage device after the start unit command is issued. The following options are available:

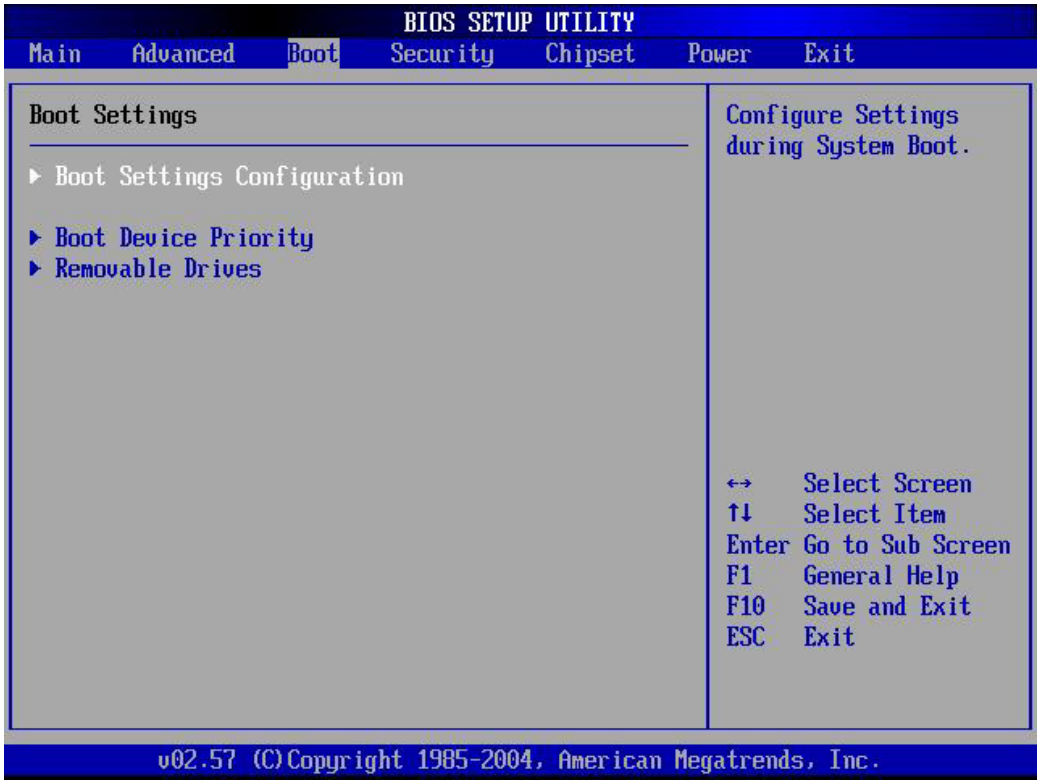
- 10 sec
- 20 sec
- 30 sec
- 40 sec

➔ **Device #1**

The **Device #1** listing shows the details of the USB drive attached to the system.

5.4 Boot

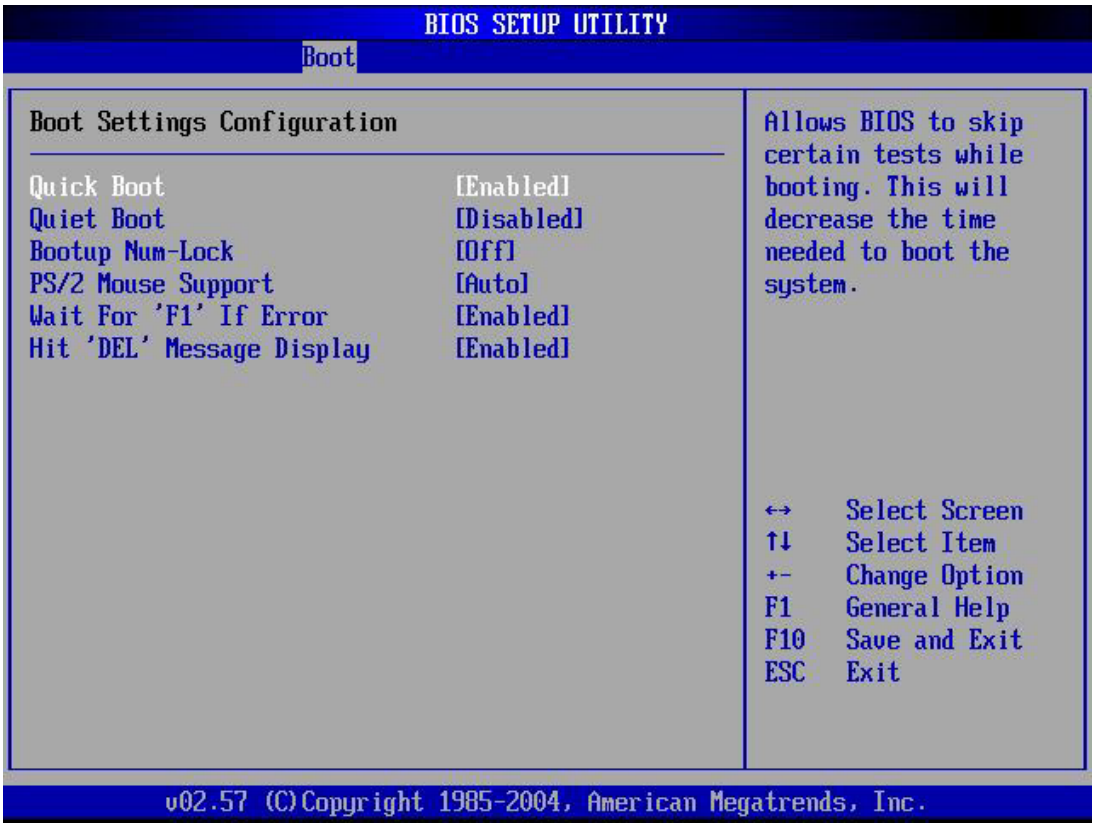
The **Boot** menu (**BIOS Menu 13**) allows you to configure system boot options.



BIOS Menu 13: Boot

5.4.1 Boot Settings Configuration

The **Boot Settings Configuration** menu (**BIOS Menu 13**) allows you to configure advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
Bootup Num-Lock [Off]
PS/2 Mouse Support [Auto]
Wait For 'F1' If Error [Enabled]
Hit 'DEL' Message Display [Enabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 14: Boot Settings Configuration [Boot]

➔ **Quick Boot [Enabled]**

The **Quick Boot** BIOS option allows you to make the computer speed up the boot process.

➔ **Disabled** System does not skip any POST procedures

➔ **Enabled** (Default) Allows system to skip some POST procedures to decrease the system boot time

➔ **Quiet Boot [Disabled]**

The **Quiet Boot** BIOS option allows the boot up screen options to be modified between POST messages or an OEM logo.

➔ **Disabled**	(Default)	Displays normal POST messages
➔ **Enabled**		Displays OEM Logo instead of POST messages

➔ **Bootup Num-Lock [Off]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

➔ **Off**	(Default)	Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
➔ **On**		Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **PS/2 Mouse Support [Enabled]**

The **PS/2 Mouse Support** BIOS option allows the PS/2 mouse support to be adjusted.

➔ **Disabled**	Disables PS/2 mouse support and prevents the PS/2 mouse port from using system resources.
➔ **Enabled**	Allows the system to use a PS/2 mouse.

➔ **Auto** (Default) Allows the system to automatically detect if a PS/2 mouse is being used.

➔ **Wait For 'F1' If Error [Enabled]**

The **Wait For 'F1' if Error** option allows you to specify how the system responds when the system detects an error on boot up.

➔ **Disabled** If there is an error when booting up, the system does not wait for user intervention but continues to boot up in the operating system. Only use this setting if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached.

➔ **Enabled** (Default) If there is an error during boot up, the system waits for a user to press "F1" and enter the BIOS to rectify the problem. The BIOS can then be adjusted to the correct settings.

➔ **Hit 'DEL' Message Display [Enabled]**

The **Hit "DEL" Message Display** option allows you to specify whether the instruction to hit the delete button to enter BIOS during POST appears or not.

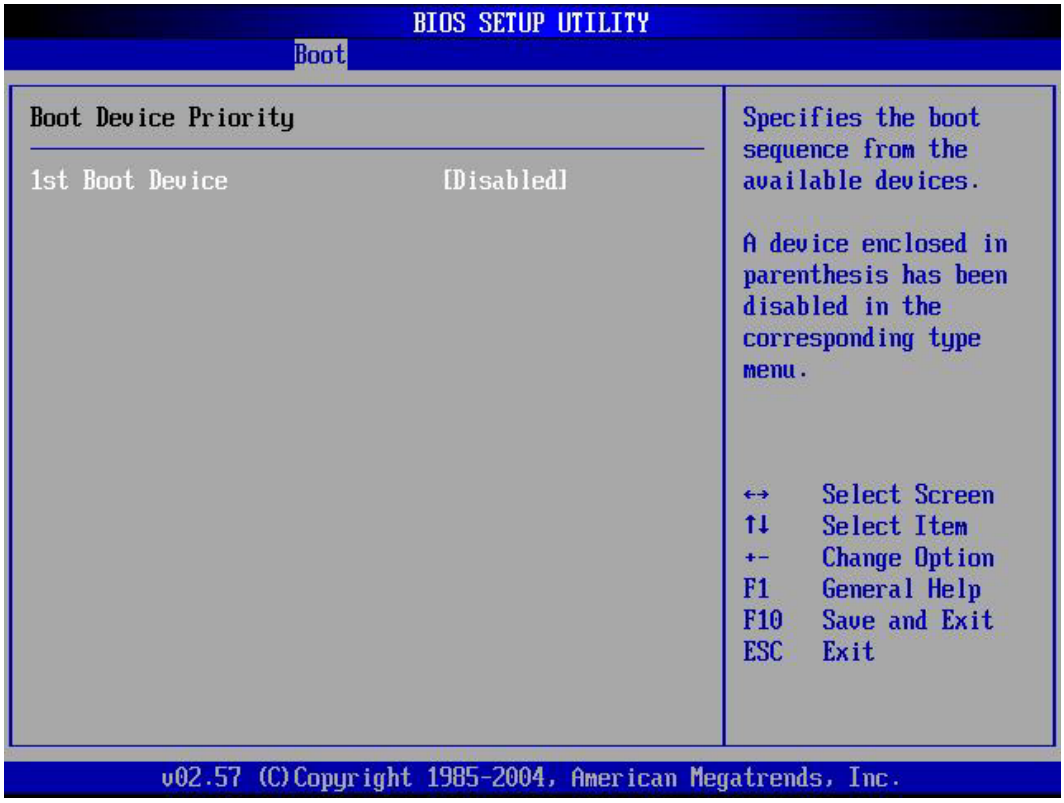
➔ **Disabled** No message displayed during POST

➔ **Enabled** (Default) Displays "Press DEL to run Setup" message in POST

5.4.2 Boot Device Priority

The **Boot Device Priority** menu (**BIOS Menu 15**) specifies the boot sequence from the available devices. Possible boot devices may include:

- HDD
- CD/DVD


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device [Disabled]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 15: Boot Device Priority Settings [Boot]

5.4.3 Hard Disk Drives

The **Hard Disk Drives** menu is similar to the **Removable Drives BIOS Menu 16** and it specifies the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

- 1st Drive [HDD: PM-(part number)]
- 2nd Drive [HDD: PS-(part number)]
- 3rd Drive [HDD: SM-(part number)]
- 4th Drive [HDD: SM-(part number)]

NOTE:

Only the drives connected to the system are not shown. For example, if only two HDDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

You can then select the boot sequence from the available devices. If you select the "**1st Drive**" option a list of available HDDs are shown. Select the first HDD you wish the system to boot from. If you do not wish to boot from the "**1st Drive**" you may also disable it.

5.4.4 Removable Drives

The **Removable Drives** menu (**BIOS Menu 16**) specifies the boot sequence of the available removable drives. When the menu is opened, the removable drives connected to the system are listed as shown below:

- 1st Drive [Drive Details]
- 2nd Drive [Drive Details]

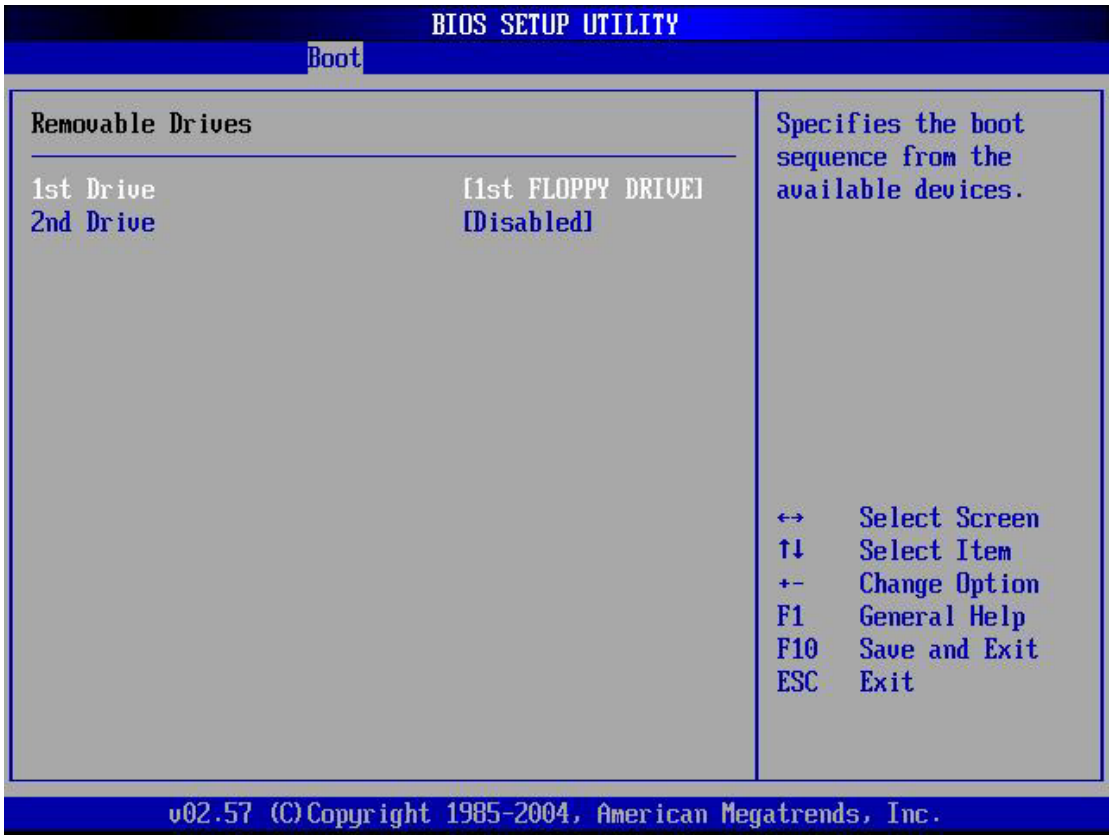
NOTE:

Only the drives connected to the system are shown. For example, if only one removable drive is connected only "**1st Drive**" is listed.

You can then select the boot sequence from the available devices. If you select the "**1st Drive**" option a list of available removable drives are shown. Select the first removable drive you wish the system to boot from. If you do not wish to boot from the "**1st Drive**" you may also disable it.

NOTE:

There is no floppy disk function on the Enano-8523T. The removable drives that may be listed include USB drives.



BIOS Menu 16: Removable Drives [Boot]

5.4.5 CD/DVD Drives

The CD/DVD Drives menu is similar to the **Removable Drives BIOS Menu 16** and it specifies the boot sequence of the available CD/DVD drives. When the menu is opened, the CD drives and DVD drives connected to the system are listed as shown below:

- 1st Drive [CD/DVD: PM-(part ID)]
- 2nd Drive [HDD: PS-(part ID)]
- 3rd Drive [HDD: SM-(part ID)]
- 4th Drive [HDD: SM-(part ID)]

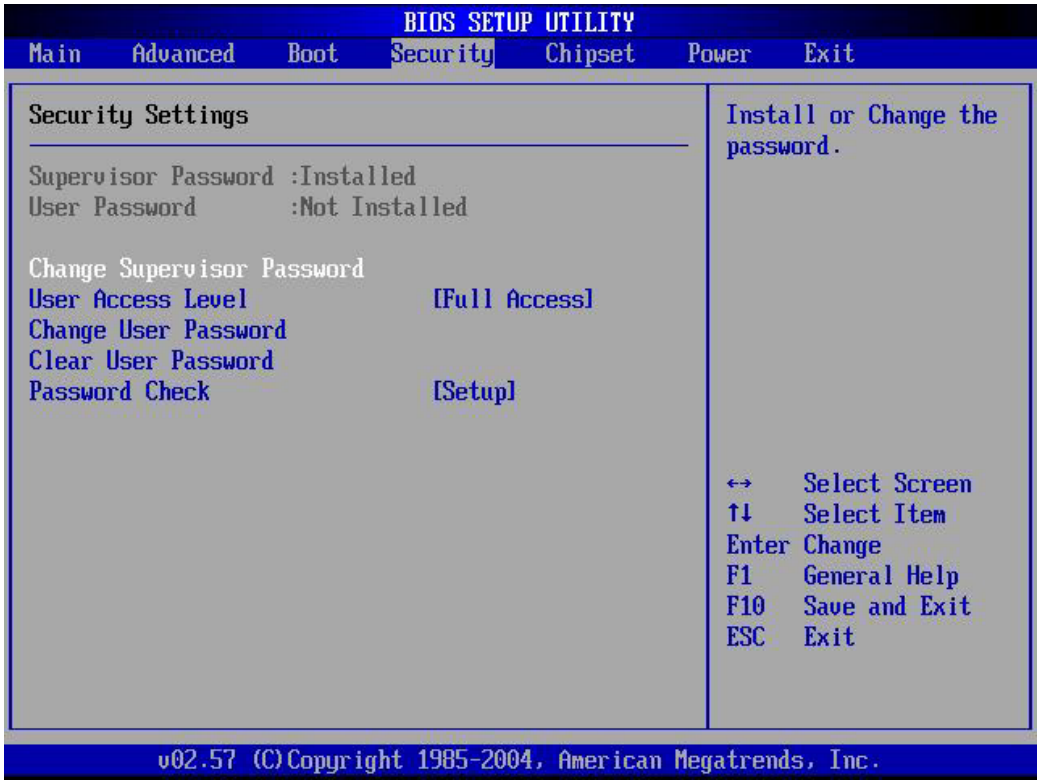
NOTE:

Only the drives connected to the system are shown. For example, if only two CDs or DVDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

You can then select the boot sequence from the available devices. If you select the "**1st Drive**" option a list of available HDDs are shown. Select the first HDD you wish the system to boot from. If you do not wish to boot from the "**1st Drive**" you may also disable it.

5.5 Security

The **Security** menu (**BIOS Menu 17**) allows you to configure the system security settings including passwords.



BIOS Menu 17: Security

➔ **Change Supervisor Password**

The default setting for the **Change Supervisor Password** is **Not Installed**. If you wish to install a supervisor password, select this field and enter the password. After the password has been added, a **User Access Level** option and a **Password Check** option appear.

➔ **User Access Level [Full Access]**

The **User Access Level** option allows you to specify the access a normal user has to the BIOS settings.

➔ **No Access**	Users have no access to the **Setup Utility**
➔ **View Only**	Users can only view the **Setup Utility**
➔ **Limited**	Users can change limited fields like date and time

➔ **Full Access** (Default) Users have full access to the **Setup Utility**

➔ **Change User Password**

The default setting for the Change User Password is Not Installed. If you wish to install a user password, select this field and enter the password. After the password has been added, Install appears next to Change User Password.

➔ **Password Check [Setup]**

The **Password Check** option allows you to specify when a user is prompted for the password.

➔ **Setup** (Default) Users have to enter their password only when they enter the **Setup Utility**

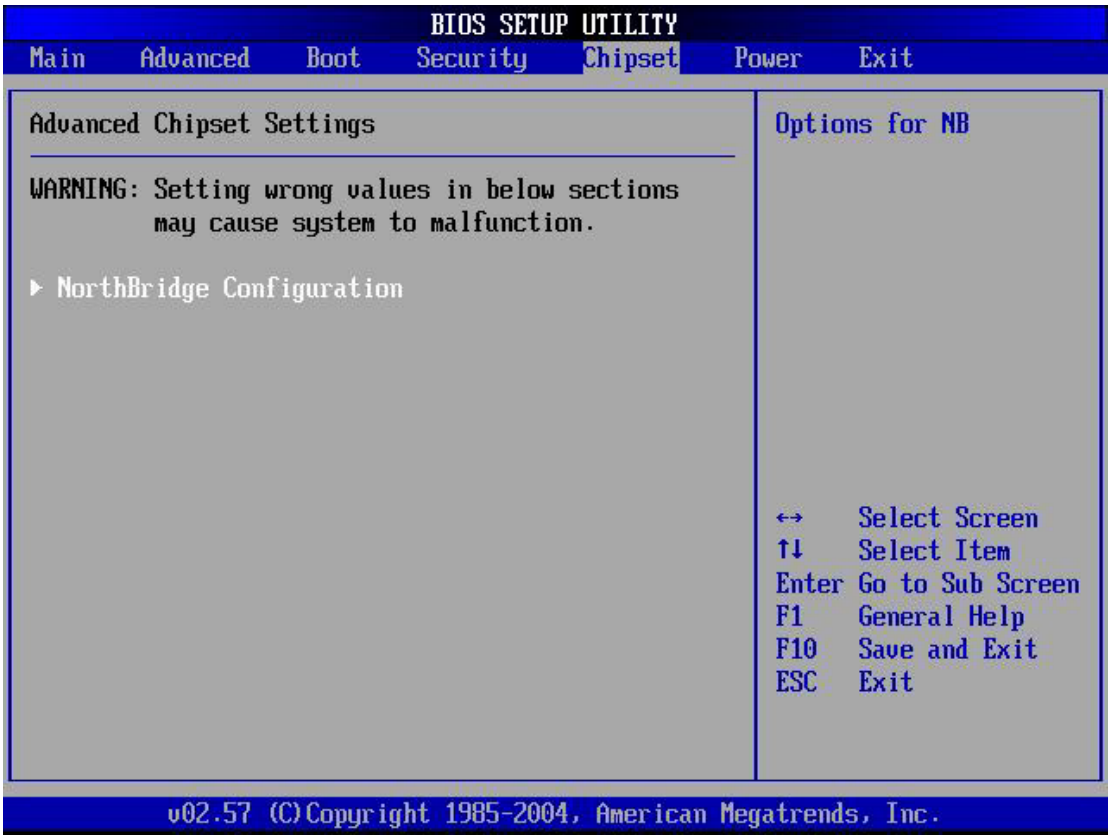
➔ **Always** Users have to enter their password whenever they boot the computer

5.6 Chipset

The **Chipset** menu (**BIOS Menu 18**) has one sub-menu, **Northbridge**. The **Northbridge** submenu allows you to configure the Northbridge chipset.

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced Boot Security Chipset Power Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction.
NorthBridge Configuration
Options for NB
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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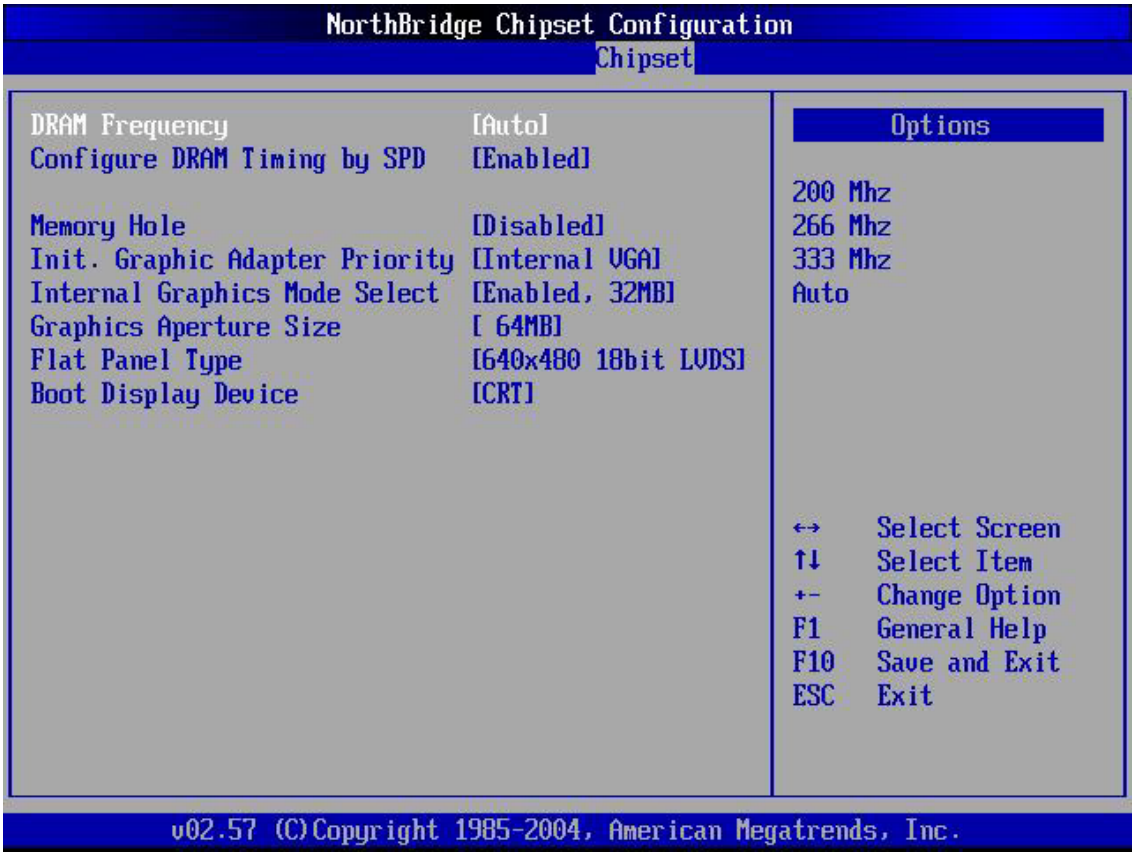
BIOS Menu 18: Chipset

5.6.1 Northbridge Configuration

The **Northbridge** Configuration menu (**BIOS Menu 18**) allows you to configure the Northbridge chipset.



BIOS Menu 19:Northbridge Chipset Configuration [Chipset]

➔ **DRAM Frequency [Auto]**

The **DRAM Frequency** option allows you to specify the DRAM frequency or allow the system to automatically detect the DRAM frequency.

➔	**200MHz**		Sets the DRAM frequency to 200MHz
➔	**266MHz**		Sets the DRAM frequency to 266MHz
➔	**333MHz**		Sets the DRAM frequency to 333MHz
➔	**Auto**	(DEFAULT)	Automatically selects the DRAM frequency

➔ **Configure DRAM Timing by SPD [Enabled]**

The **Configure DRAM Timing by SPD** option allows you to determine if the system uses the SPD *(*Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications the including speed of the individual components such as CAS and bank cycle time as well as valid settings for the module and the manufacturer's code. The SPD enables the BIOS to read the spec sheet of the DIMMs on boot-up and then adjust the memory timing parameters accordingly.

➔ **Disabled** DRAM timing parameters can be manually set using the DRAM sub-items

➔ **Enabled** (DEFAULT) DRAM timing parameter are set according to the DRAM Serial Presence Detect (SPD)

The **Configure DRAM Timing by SPD** option is disabled, the following configuration options appear.

- DRAM CAS# Latency [2.5]
- DRAM RAS# Precharge [3 clocks]
- DRAM RAS# to CAS# Delay [3 clocks]
- DRAM Precharge Delay [7 clocks]
- DRAM Burst Length [8]

➔ **DRAM CAS# Latency [2.5]**

The **CAS Latency Time** configuration option refers to the Column Address Strobe (CAS) delay time. (To be able to change this configuration option the **DRAM Latency Timing** configuration option must be set to "**Manual**") The following configuration options are available

- 2.5 nanoseconds (DEFAULT)
- 2 nanoseconds

➔ **DRAM RAS# Precharge [3 clocks]**

The **DRAM RAS# Precharge** option indicates how fast your RAM can terminate the access of one row and start accessing another. (To be able to change this configuration

option the **DRAM RAS# Precharge** configuration option must be set to "**Manual**") The following configuration options are available

- 2 clocks
- 3 clocks (DEFAULT)

➔ **DRAM RAS# to CAS# Delay [3 clocks]**

The **DRAM RAS# to CAS# Delay** refers to the Row Address Strobe (RAS) to CAS delay time. (To be able to change this configuration option the **DRAM Latency Timing** configuration option must be set to "**Manual**") The following configuration options are available

- 2 clocks
- 3 clocks (DEFAULT)

➔ **DRAM Precharge Delay [7 clocks]**

The **Precharge Delay** option allows you to set the time it takes for the RAS to start retrieving the actual data after a request has been issued to the memory module. (To be able to change this configuration option the **DRAM RAS# Precharge** configuration option must be set to "**Manual**") The following configuration options are available,

- 5 clocks
- 6 clocks
- 7 clocks (DEFAULT)

➔ **DRAM Burst Length**

The **DRAM Burst Length** BIOS option allows you to select the reads/writes per burst transaction. The following options are available,

- 4 → 4 read or writes per burst transaction
- 8 → 8 read or writes per burst transaction

➔ **Memory Hole At 15M – 16M [Disabled]**

The **Memory Hole At 15M – 16M** reserves the memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If you are using older ISA expansion cards, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

- ➔ **Disabled** (DEFAULT) Memory is not reserved for ISA expansion cards
- ➔ **Enabled** Memory is reserved for ISA expansion cards

➔ **Init. Graphic Adapter Priority [Internal VGA]**

The **Init. Graphic Adapter Priority** option allows you to select the graphics controller the system uses as a primary boot device. The options are:

- Internal VGA
- PCI/Int-VGA

➔ **Internal Graphics Mode Select [Enable, 32MB]**

The **Internal Graphic Mode Select** option allows you to determine the amount of system memory that can be used by the Internal graphics device.

- ➔ **Disable**
- ➔ **Enable, 1MB** 1MB of memory used by internal graphics device
- ➔ **Enable, 4MB** 4MB of memory used by internal graphics device
- ➔ **Enable, 8MB** 8MB of memory used by internal graphics device
- ➔ **Enable, 16MB** 16MB of memory used by internal graphics device
- ➔ **Enable, 32MB** (DEFAULT) 32MB of memory used by internal graphics device

➔ **Graphics Aperture Size [64MB]**

The **Graphics Aperture Size** option allows you to select the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated as graphics memory address space.

➔	**64MB**	(DEFAULT)	Graphics aperture size set as 64MB
➔	**128MB**		Graphics aperture size set as 128MB
➔	**256MB**		Graphics aperture size set as 256MB

➔ **Flat Panel Type [640x480 18bit LVDS]**

The **Flat Panel Type** BIOS option allows you to specify the flat panel PC type you are using.

NOTE:

Please refer to the technical documents that came with your flat panel PC to ensure that you select the correct settings

The following options are available:

- 640x480 18bit LVDS (Default)
- 800x600 18bit LVDS
- 1024x768 18bit LVDS
- 1280x1024 36bit LVDS
- 1400x1050 36bit LVDS
- 1600x1200 36bit LVDS
- 1440x900 36bit LVDS
- 1440x900 48bit LVDS
- 1280x800 18bit LVDS
- 1024x768 24bit LVDS
- 1280x600 18bit LVDS

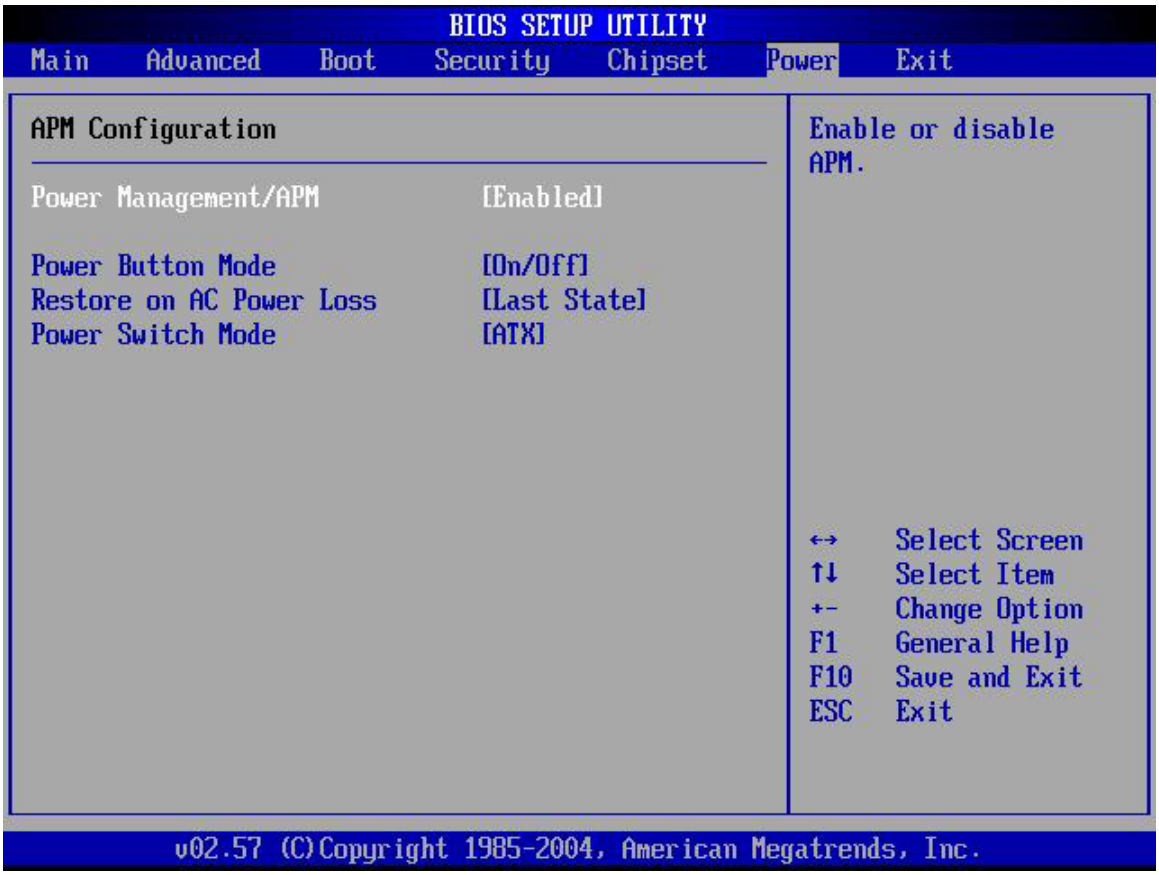
➔ **Boot Display Device [CRT]**

The **Boot Display Device** BIOS option allows you to select the display device the system uses when it boots. The available options are listed below:

- Auto
- CRT (Default)
- LFP
- CRT + LFP

5.7 Power

The **Power** menu (**BIOS Menu 20**) allows you to configure advanced power management options.



BIOS Menu 20:Power

➔ **Power Management/APM [Enabled]**

The **Power Management/APM** BIOS option allows you to access the advanced power management features.

- ➔ **Disabled** Disables the Advanced Power Management (APM) feature
- ➔ **Enabled** (Default) Enables the APM feature

➔ **Power Button Mode [On/Off]**

The **Power Button Mode** BIOS option allows you to specify how the power button functions.

- ➔ **On/Off** (Default) When the power button is pressed the system is either turned on or off
- ➔ **Suspend** When the power button is pressed the system goes into suspend mode

➔ **Restore on AC Power Loss [Last State]**

The Restore on AC Power Loss BIOS option allows you to specify what state the system returns to if there is a sudden loss of power to the system.

- ➔ **Power Off** The system remains turned off
- ➔ **Power On** The system turns on
- ➔ **Last State** (Default) The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

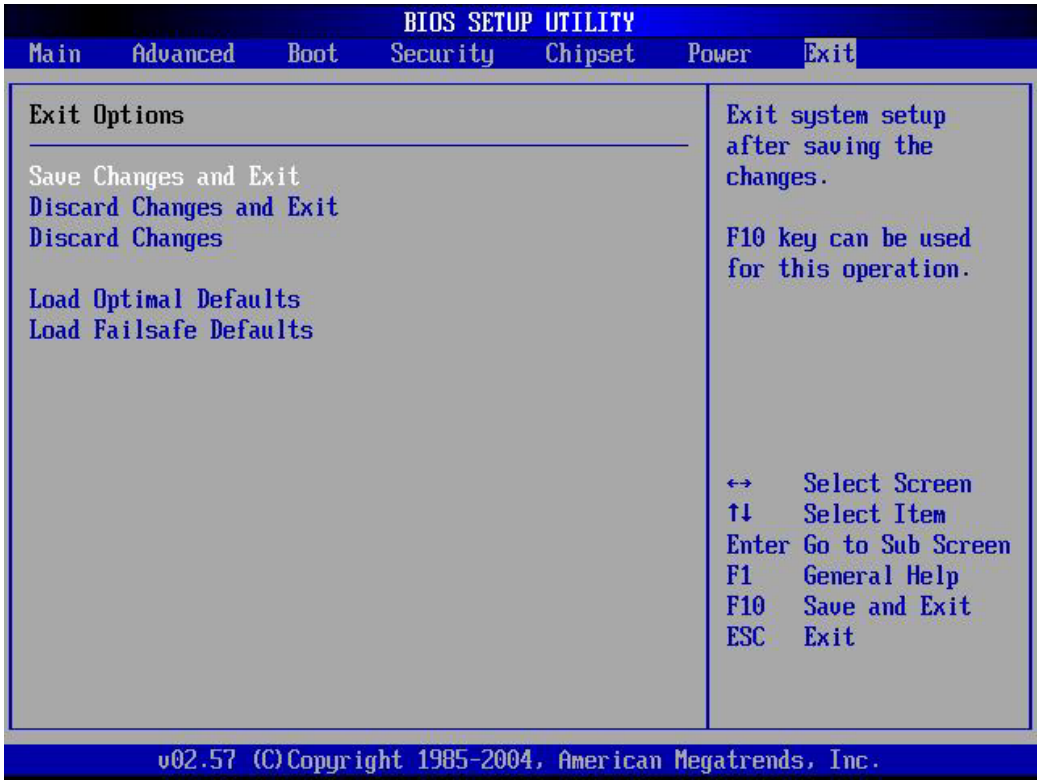
➔ **Power Switch Mode [ATX]**

The **Power Switch Mode** BIOS option allows you to

- ➔ **ATX** (Default)
- ➔ **AT**

5.8 Exit

The **Exit** menu (**BIOS Menu 21**) allows you to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 21:Exit

➔ **Save Changes and Exit**

If you have finished making the configuration changes and wish to save them and exit the BIOS menus, select this option.

➔ **Discard Changes and Exit**

If you have finished making configuration changes but do not want to save them and you want to exit the BIOS menus, select this option.

➔ **Discard Changes**

If you have finished making configuration changes but do not want to save them but still want to continue working with BIOS, select this option.

➔ **Load Optimal Defaults**

This option allows you to load optimal default values for each of the parameters on the Setup menus. F9 key can be used for this operation.

➔ **Load Failsafe Defaults**

This option allows you to load failsafe default values for each of the parameters on the Setup menus. F8 key can be used for this operation.

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The contents of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the IEI website or contact technical support for the latest updates.

The Enano-8523T board has four software drivers:

- Chipset
- Audio
- LAN
- VGA

All four drivers can be found on the CD that came with the Enano-8523T. To install the drivers please follow the instructions in the sections below

6.2 Chipset Driver Installation

To install the chipsetdriver, please follow the steps below:

Step 1: Insert the CD into the system that contains the Enano-8523T board. Open the **Chipset/852GM** directory and locate the icon for the **Setup** installation file. Once located, use the mouse to move the cursor over the icon and double click the mouse button.

Step 2: The "**InstallShield Wizard Preparation Screen**" in **Figure 6-1**appears.

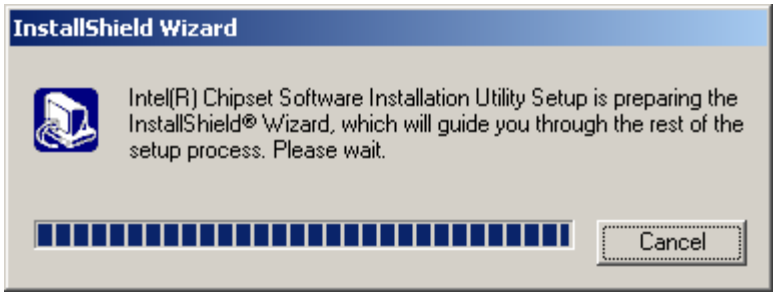

InstallShield Wizard
Intel(R) Chipset Software Installation Utility Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

Figure 6-1: InstallShield Wizard Preparation Screen

Step 3: The "**Welcome**" window in **Figure 6-2** appears next.

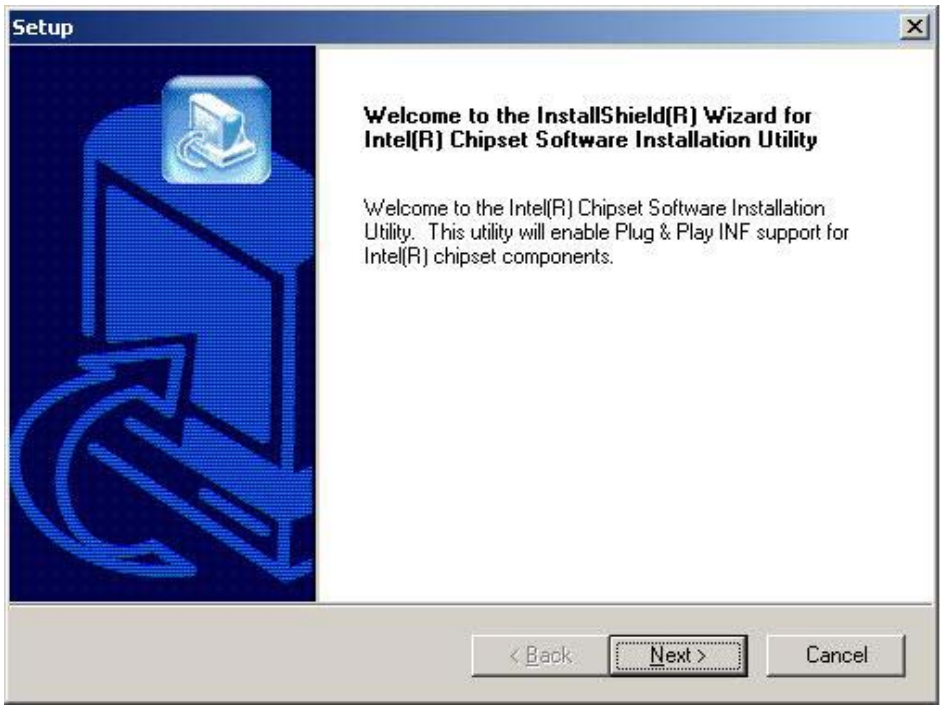

Setup
Welcome to the InstallShield(R) Wizard for Intel(R) Chipset Software Installation Utility
Welcome to the Intel(R) Chipset Software Installation Utility. This utility will enable Plug & Play INF support for Intel(R) chipset components.
< Back
Next >
Cancel

Figure 6-2: Welcome Screen

Step 4: Click "**NEXT**" and the license agreement shown in **Figure 6-3** appears.

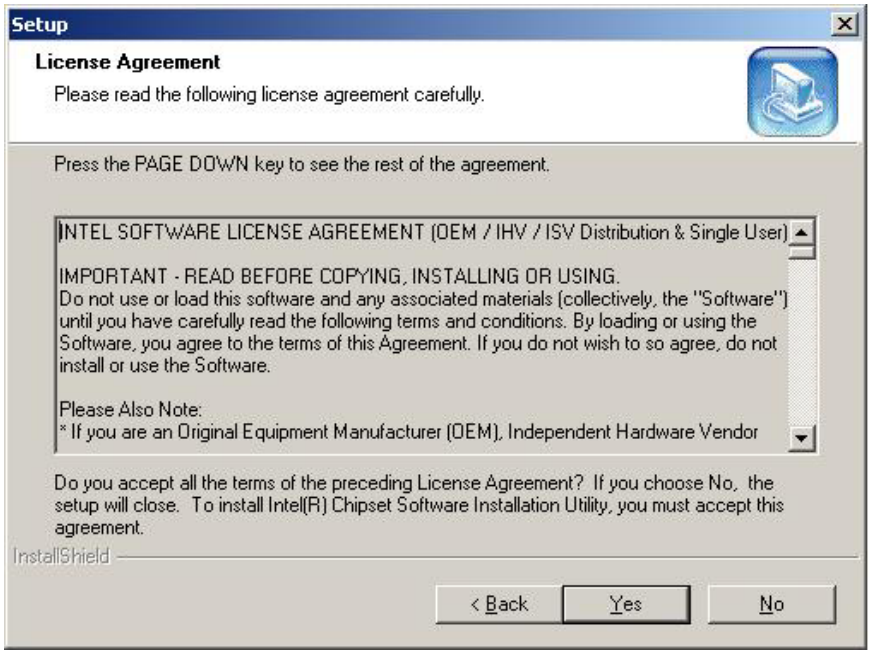

Setup
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor
Do you accept all the terms of the preceding License Agreement? If you choose No, the setup will close. To install Intel(R) Chipset Software Installation Utility, you must accept this agreement.
InstallShield
< Back
Yes
No

Figure 6-3: License Agreement

Step 5: If you agree to the license terms click "**YES**." The "**Readme**" in **Figure 6-4** appears.

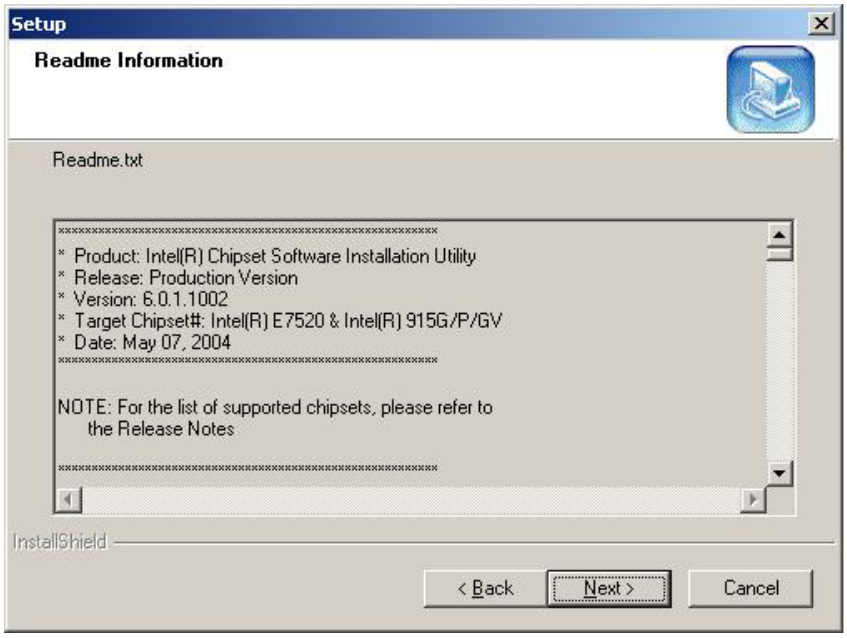


Figure 6-4: Readme Information

Step 6: Click "**YES**." The driver is installed on the computer. After the installation is complete the installation complete screen shown in **Figure 6-5** appears. Select the option you prefer and click "**FINISH**" to complete the installation process.

Setup
InstallShield(R) Wizard Complete
The InstallShield(R) Wizard has successfully installed Intel(R) Chipset Software Installation Utility. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

Figure 6-5: Restart the Computer

6.3 RealTek Audio Driver Installation

To install the RealTek AC'97 Audio driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the Enano-8523T board. Open the CD folder and locate the **AUDIO DRIVER A3.79** directory. Open the directory and look for icon for the **setup.exe** installation file. Once located, use the mouse to move the cursor over the icon and double click the mouse button.

Step 2: Once you double click the **Setup** icon, the install shield wizard for the audio driver starts. See **Figure 6-6.**

Figure 6-6: Audio Driver Install Shield Wizard Starting

Step 3: The RealTek Audio Setup prepares the install shield to guide you through the rest of the setup process. See **Figure 6-7**.

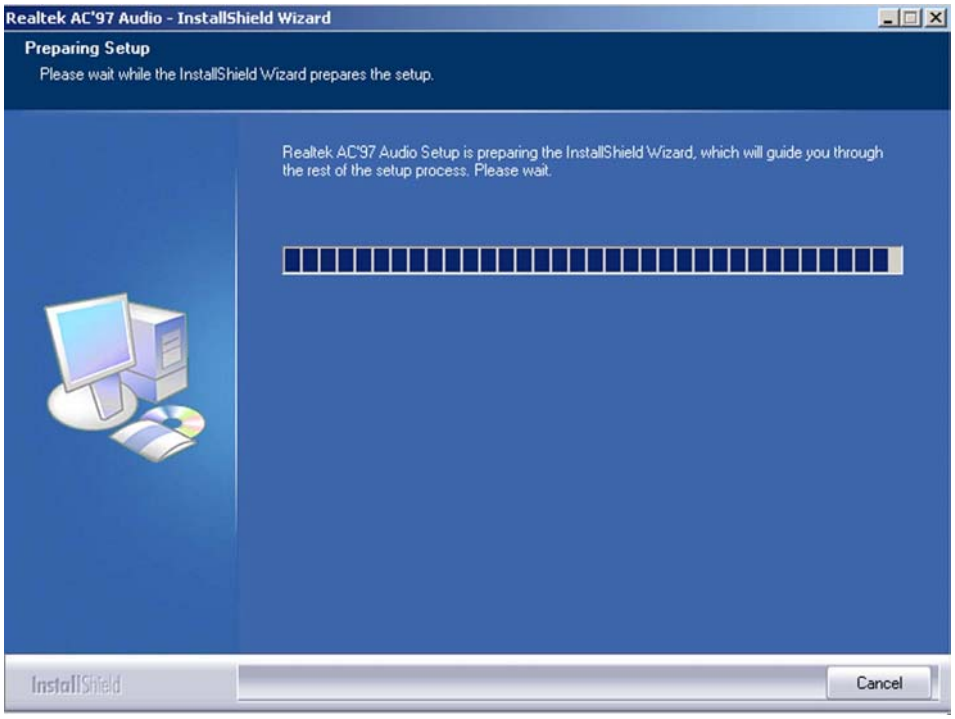

Realtek AC'97 Audio - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Realtek AC'97 Audio Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 6-7: Audio Driver Setup Preparation

Step 4: After install shield is prepared, the welcome screen shown in **Figure 6-8** appears. To continue the installation process, click the "**NEXT**" button. The install shield starts to configure the new software as shown in **Figure 6-9**.

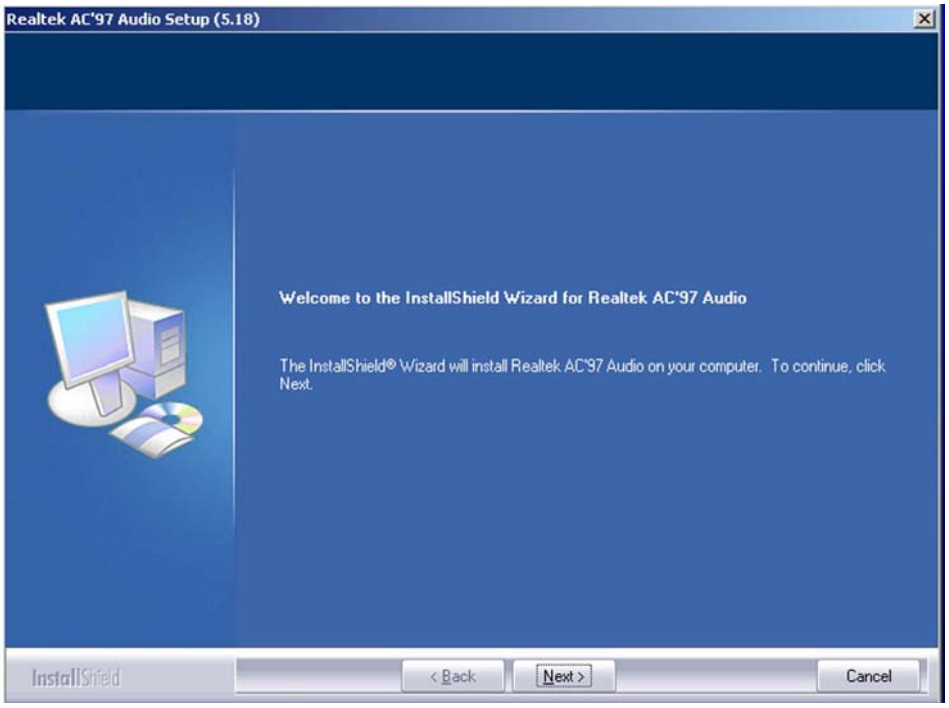

Realtek AC'97 Audio Setup (5.18)
Welcome to the InstallShield Wizard for Realtek AC'97 Audio
The InstallShield® Wizard will install Realtek AC'97 Audio on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 6-8: Audio Driver Welcome Screen

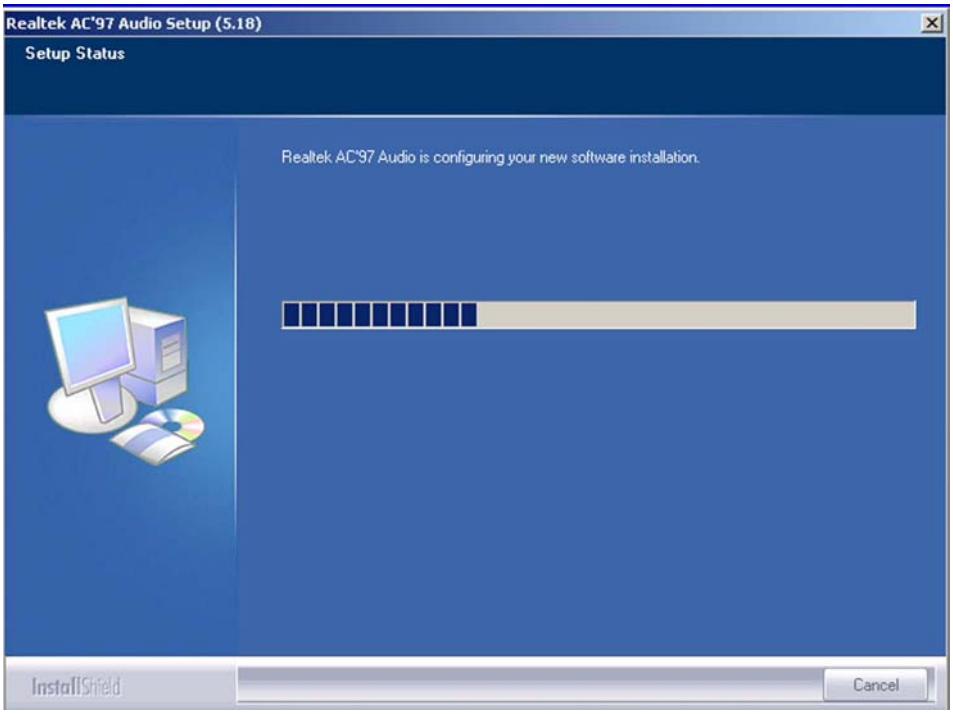


Figure 6-9: Audio Driver Software Configuration

Step 5: At this stage the "**Digital Signal Not Found**" screen shown in **Figure 6-10**

appears. To continue the installation process, click the "**YES**" button. The installation notice shown below appears.

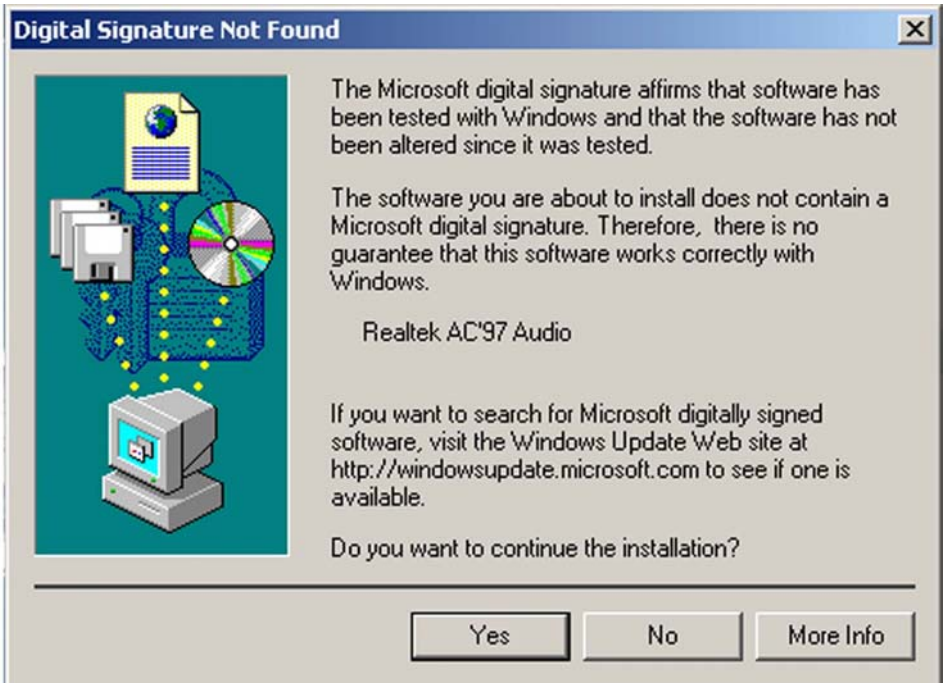

Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Realtek AC'97 Audio
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

Figure 6-10: Audio Driver Digital Signal

Step 6: At this stage the clicking the "**YES**" button in **Figure 6-10** appears, the installation of the driver begins. See **Figure 6-11**.

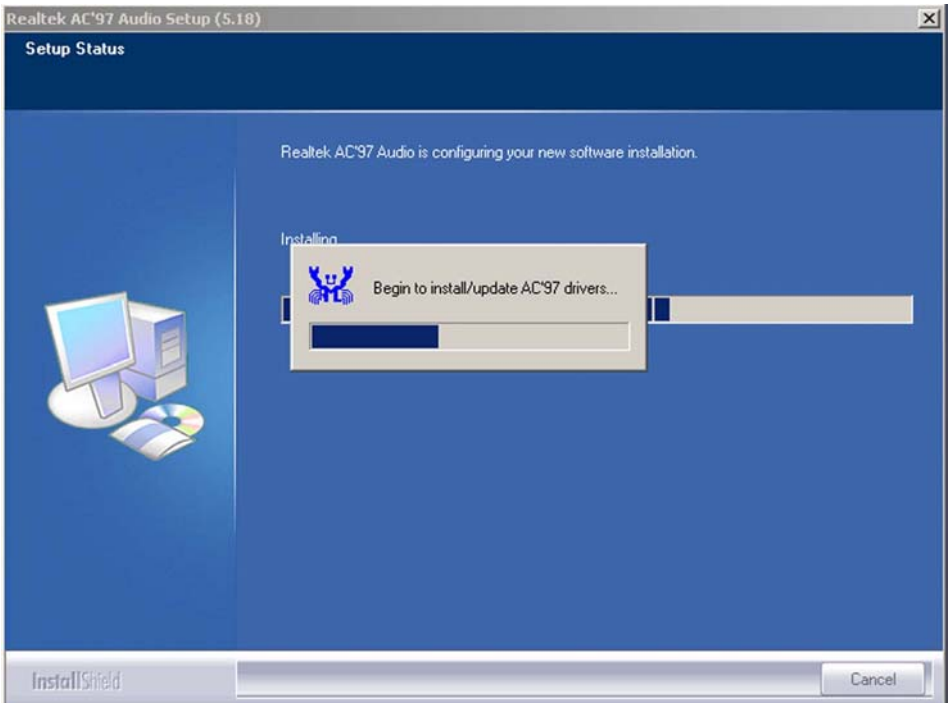


Figure 6-11: Audio Driver Installation Begins

Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 6-12** appears

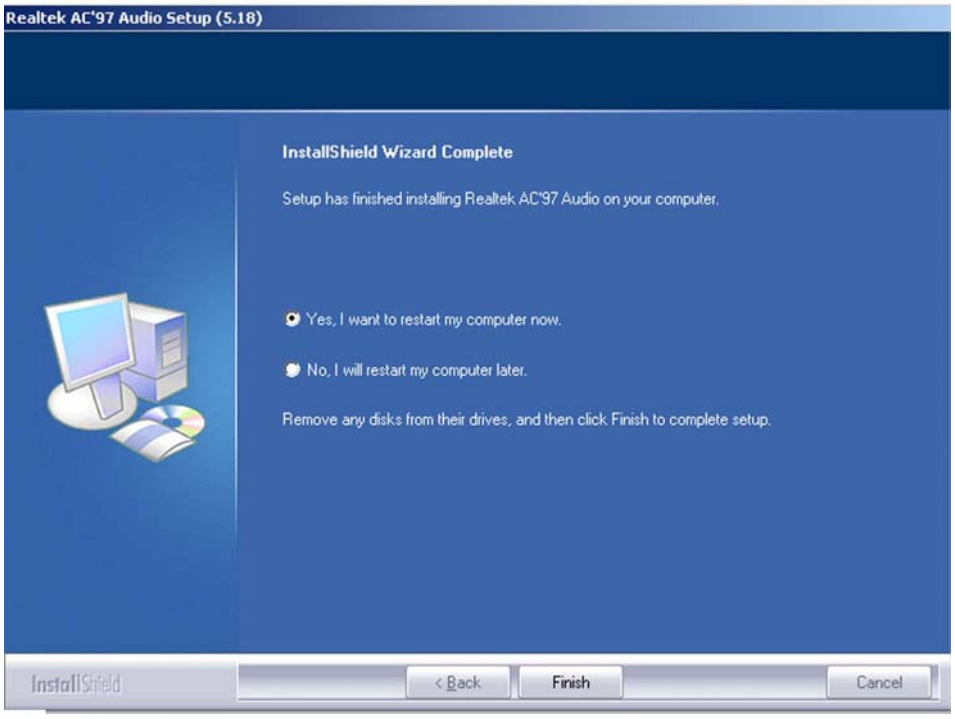

Realtek AC'97 Audio Setup (5.18)
InstallShield Wizard Complete
Setup has finished installing Realtek AC'97 Audio on your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 6-12: Audio Driver Installation Complete

Step 8: The confirmation screen shown in **Figure 6-12** allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the "**FINISH**" button.

6.4 Intel Graphics Media Accelerator Driver

To install the GMA driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the Enano-8523T. Open the CD folder and locate the icon for the **Setup** installation file. Once located, use the mouse to move the cursor over the icon and double click the mouse button.

Step 2: Once you double click the **Setup** icon, a **Welcome** screen shown in **Figure 6-13** appears.

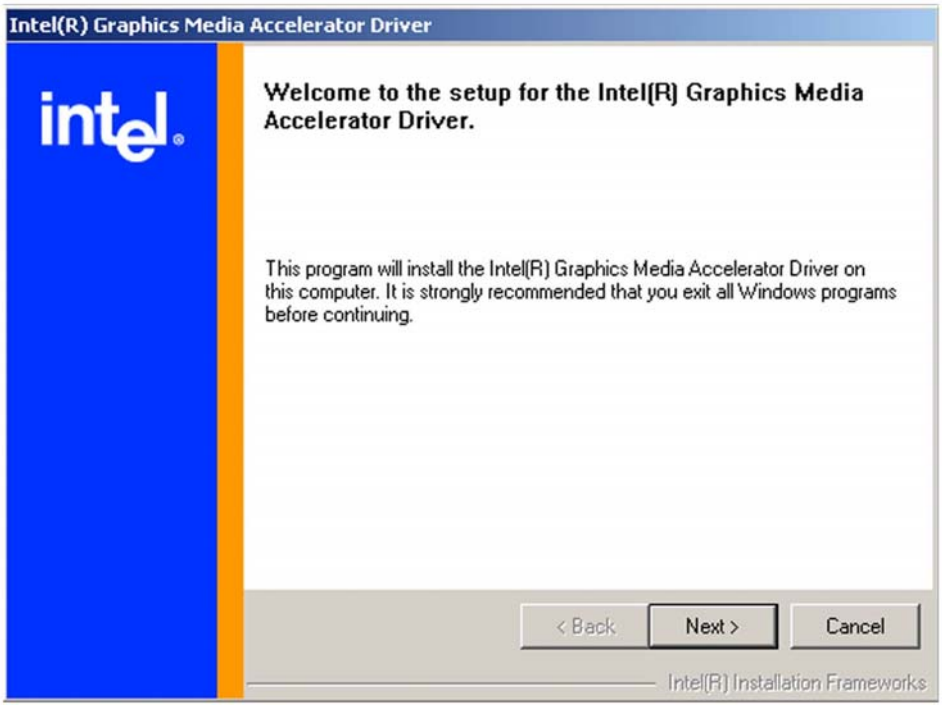

Intel(R) Graphics Media Accelerator Driver
intel
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on this computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-13: GMA Driver Installation Welcome Screen

Step 3: To continue installing click "**Next**" and a license agreement shown in **Figure 6-14** appears. Read through the license agreement.

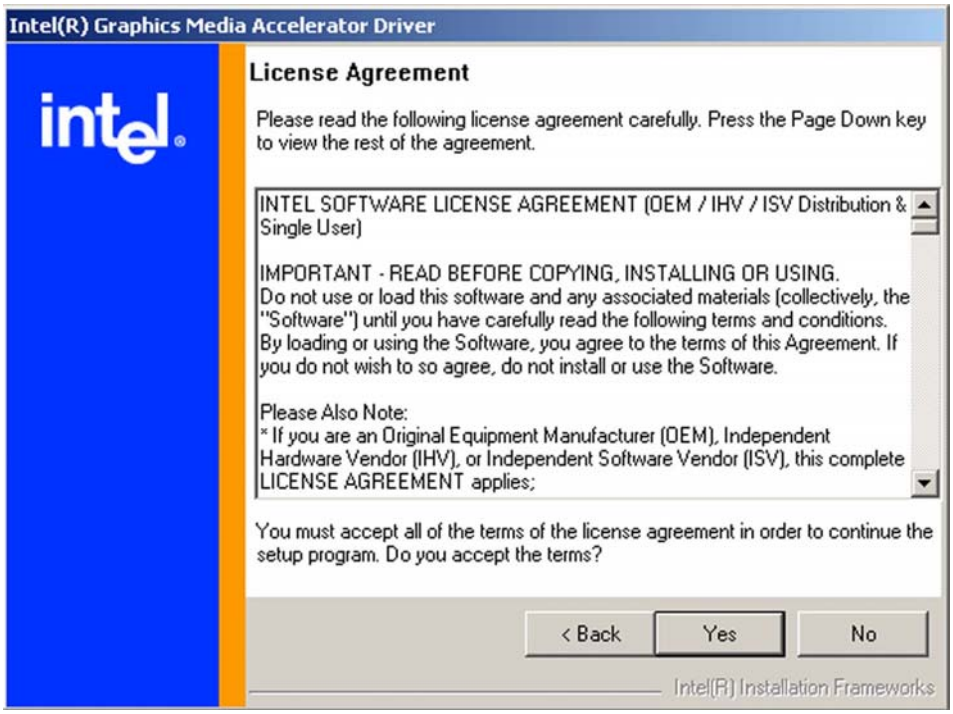

Intel(R) Graphics Media Accelerator Driver
intel
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 6-14: GMA Driver License Agreement

Step 4: If you choose to accept the terms and conditions stipulated in the license agreement shown **Figure 6-14**, click the "**YES**" button. The installation notice shown in **Figure 6-15** appears.

Figure 6-15: GMA Driver Installing Notice

Step 5: After the driver installation process is complete, a confirmation screen shown in **Figure 6-16** appears.

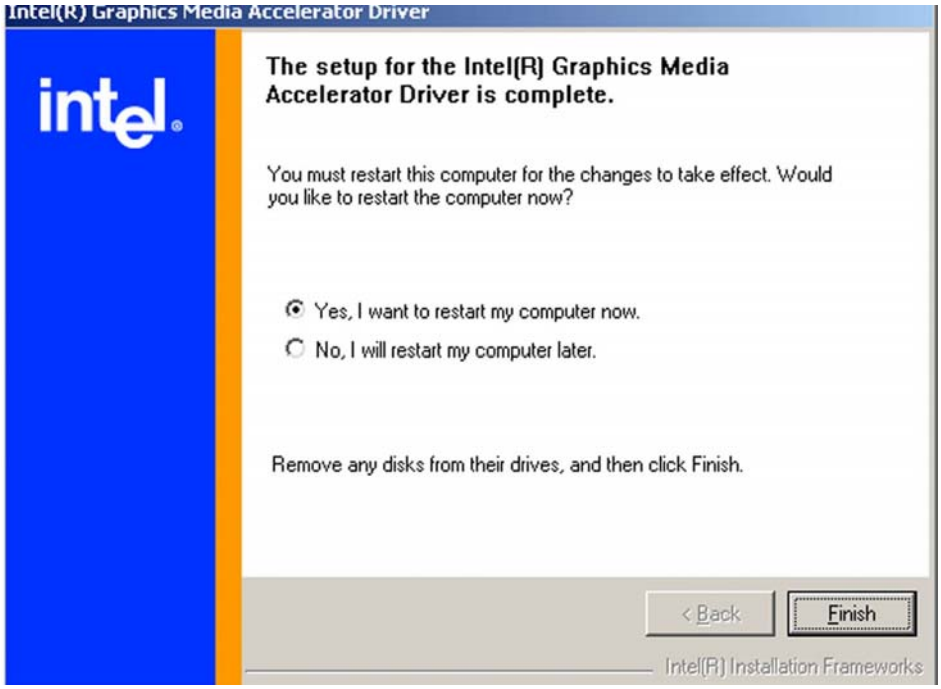

Intel(R) Graphics Media Accelerator Driver
intel
The setup for the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish.
< Back
Finish
Intel(R) Installation Frameworks

Figure 6-16: GMA Driver Installation Complete

Step 6: The confirmation screen shown in **Figure 6-16** allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the "**FINISH**" button.

6.5 LAN Driver Installation

To install the LAN driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the ENANO-852. Open the **LAN** directory and locate the icon for the relevant **Setup** installation file. Once located, use the mouse to move the cursor over the icon and double click the mouse button.

Step 2: Once you double click the **Setup** icon, a **LAN License Agreement** screen shown in **Figure 6-18** appears.

DriverInstaller - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
INTEL SOFTWARE LICENSE AGREEMENT
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 6-17: LAN License Agreement

Step 3: If you accept the terms, click "**Next**." You are then prompted for the directory the driver is stored in. (See **Figure 6-18**)

DriverInstaller - InstallShield Wizard
Location to Save Files
Where would you like to save your files?
Please enter the folder where you want these files saved. If the folder does not exist, it will be created for you. To continue, click Next.
Save files in folder:
c:\IntelPRO
Change...
InstallShield
< Back
Next >
Cancel

Figure 6-18: Select the Driver Directory

Step 4: After selecting the directory the driver is installed in, click "**Next**." The screen in **Figure 6-19** appears.

Figure 6-19: LAN Driver Configuration

Step 5: In **Figure 6-19** you have three options.

- Install Base Driver → Installs the base driver
- Make Driver Disk → Copies the driver to disk
- View Release Notes → Opens word document of the release notes

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Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in ***Chapter 5***.

➔ **System Overview** 72
➔ **OnBoard PCI IDE Controller [Both]** 76
➔ **IDE Master and IDE Slave** 77
➔ **Auto-Detected Drive Parameters** 78
➔ **Type [Auto]** 79
➔ **ZIP** 79
➔ **LS-120** 79
➔ **LBA/Large Mode [Auto]** 79
➔ **Block (Multi Sector Transfer) [Auto]** 80
➔ **PIO Mode [Auto]** 80
➔ **DMA Mode [Auto]** 81
➔ **S.M.A.R.T [Auto]** 82
➔ **32Bit Data Transfer [Enabled]** 83
➔ **Serial Port1 Address [3F8/IRQ4]** 83
➔ **Serial Port2 Address [2F8/IRQ3]** 84
➔ **Serial Port2 Address [2F8/IRQ3]** 84
➔ **Parallel Port Address [378]** 85
➔ **Parallel Port Mode [Normal]** 85
➔ **Parallel Port IRQ [IRQ7]** 86
➔ **Serial Port3 Address [3E8]** 86
➔ **Serial Port3 IRQ [11]** 86
➔ **Serial Port4 Address [2E8]** 86
➔ **Serial Port4 IRQ [10]** 87
➔ **ACPI Aware O/S [Yes]** 89
➔ **MPS Revision [1.4]** 90
➔ **TPM Device [Disabled]** 91
➔ **TPM Owner [Don't Change]** 92
➔ **USB Configuration** 93

➔ USB Devices Enabled: 93
➔ USB Function [Enabled].....93
➔ Legacy USB Support [Disabled].....94
➔ USB 2.0 Controller [Enabled].....94
➔ USB2.0 Controller Mode [HiSpeed].....94
➔ USB Mass Storage Device Configuration 94
➔ USB Mass Storage Delay [20 sec].....95
➔ Device #1 95
➔ Quick Boot [Enabled] 97
➔ Quiet Boot [Disabled] 98
➔ Bootup Num-Lock [Off] 98
➔ PS/2 Mouse Support [Enabled] 98
➔ Wait For 'F1' If Error [Enabled].....99
➔ Hit 'DEL' Message Display [Enabled] 99
➔ Change Supervisor Password..... 105
➔ User Access Level [Full Access]..... 105
➔ Change User Password..... 106
➔ Password Check [Setup]..... 106
➔ DRAM Frequency [Auto] 108
➔ Configure DRAM Timing by SPD [Enabled] 108
➔ DRAM CAS# Latency [2.5] 109
➔ DRAM RAS# Precharge [3 clocks] 109
➔ DRAM RAS# to CAS# Delay [3 clocks] 110
➔ DRAM Precharge Delay [7 clocks] 110
➔ DRAM Burst Length..... 110
➔ Memory Hole At 15M – 16M [Disabled]..... 110
➔ Init. Graphic Adapter Priority [Internal VGA] 111
➔ Internal Graphics Mode Select [Enable, 32MB] 111
➔ Graphics Aperture Size [64MB] 111
➔ Flat Panel Type [640x480 18bit LVDS]..... 112
➔ Boot Display Device [CRT] 112
➔ Power Management/APM [Enabled]..... 113

➔ Power Button Mode [On/Off] 114
➔ Restore on AC Power Loss [Last State] 114
➔ Power Switch Mode [ATX] 114
➔ Save Changes and Exit 115
➔ Discard Changes and Exit 115
➔ Discard Changes 115
➔ Load Optimal Defaults 116
➔ Load Failsafe Defaults 116

Appendix

B

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. It is recommended you contact IEI support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table B-1: AH-6FH Sub-function

You have to call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if you set the time-out value to be zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD YOUR APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is your application over?
        JNE      W_LOOP         ;No, restart your application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

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Appendix

C

Address Mapping

C.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel(R) 82915 Graphics Controller
3C0-3DF	Intel(R) 82915 Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO Address Map

C.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table C-2: 1st MB Memory Address Map

C.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table C-3: IRQ Mapping Table

C.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table C-4: IRQ Mapping Table

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Appendix

D

External AC'97 Audio CODEC

D.1 Introduction

The audio functionalities of the Enano-8523T CPU come with an onboard Realtek ALC655 16-bit, full duplex AC'97 2.3 compatible audio CODEC with 48KHz sampling rate. The CODEC is accessed through one phone jack connector and two three pin headers including:

1. A LINE input shared with surround output
2. A MIC input shared with Center and LFE output
3. A LINE output
4. A MIC input line.

The ALC655 supports host/soft audio from Intel ICHx chipsets as well as audio controller based VIA/SIS/Ali/ATI chipset with bundled Windows series drivers (XP/ME/2000/98/NT), EAX/Direct Sound 3D/I3DL2/A3D compatible sound effect utilities supporting Karaoke, 26 kinds of environment sound emulations with 10-band equalizer, and HRTF 3D positional audio. The audio kit provides an excellent entertainment package sufficient for today's multimedia systems.

D.2 Driver Installation

The driver installation has been described in Chapter 6, Section 6.3.

After reboot, you should be able to find the sound effect configuration utility in Windows Control Panel (see Figure D-1); and if peripheral speakers have been properly connected, hear the sound effects.

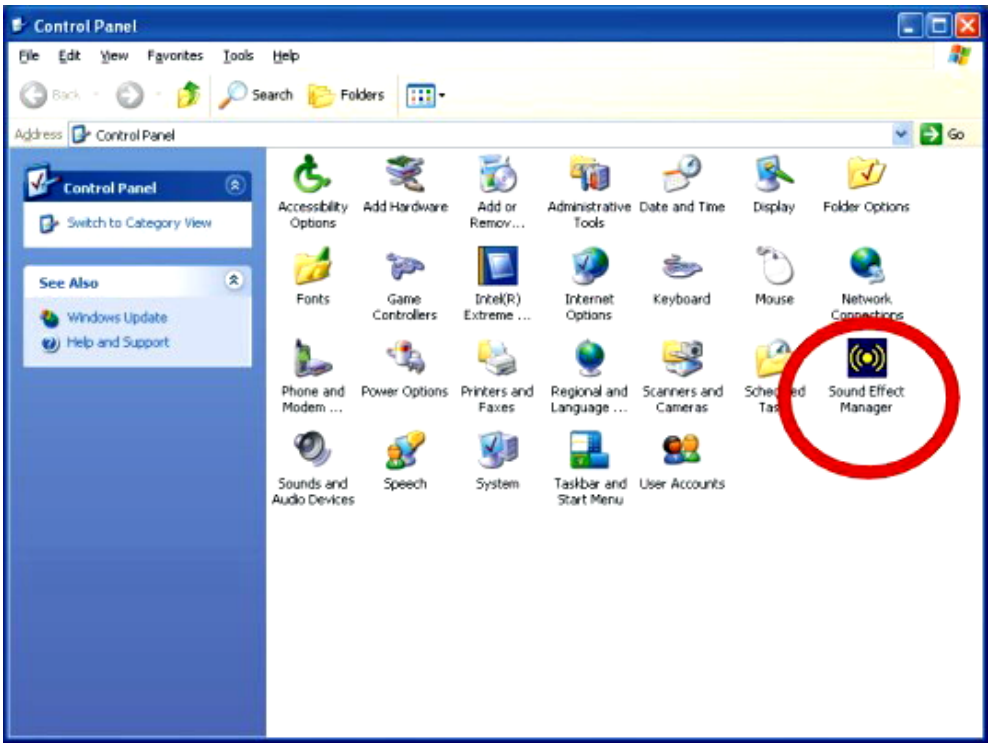

Figure D-1: Sound Effect Manager Icon

D.3 Sound Effect Configuration

After installing the audio CODEC driver, you should be able to use the multi-channel audio features now. Click the audio icon from the Notification Area from system task bar (see Figure D-3). The shortcut to the configuration utility is also available through the Sound Effect Manager icon in the Control Panel (Figure D-2).

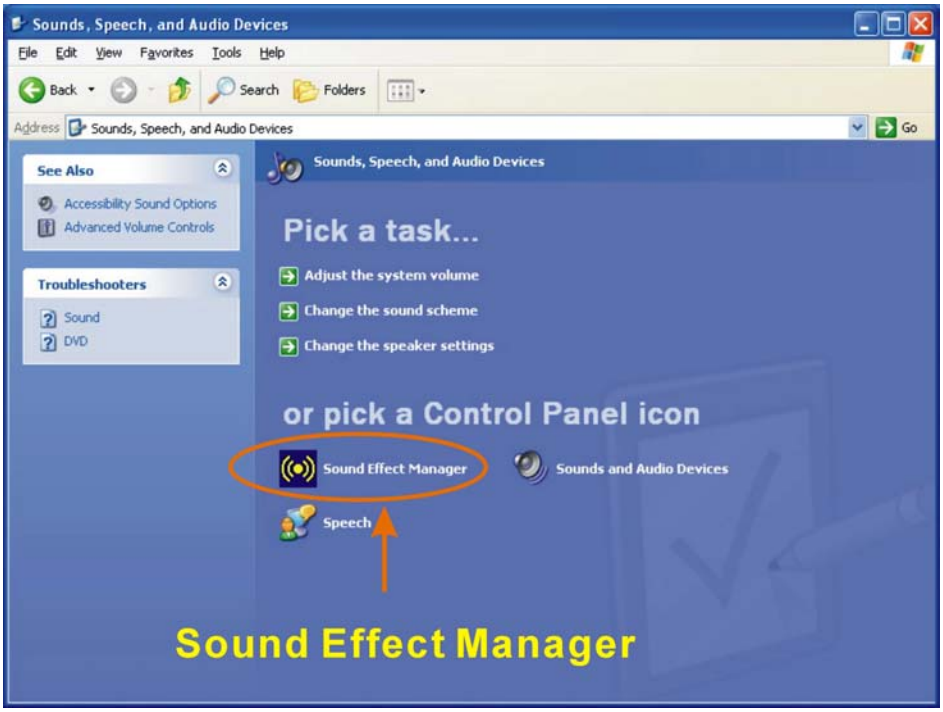

Figure D-2: Sound Effect Manager Icon [Control Panel]

Figure D-3: Sound Effect Manager Icon [Task Bar]

D.4 Sound Effect

You may select a pre-configured sound environment setting with the preset equalizer settings. You may also load an equalizer setting or make a new equalizer setting using the “Load EQ Setting” and “Save Preset” button. (See Figure D-5)

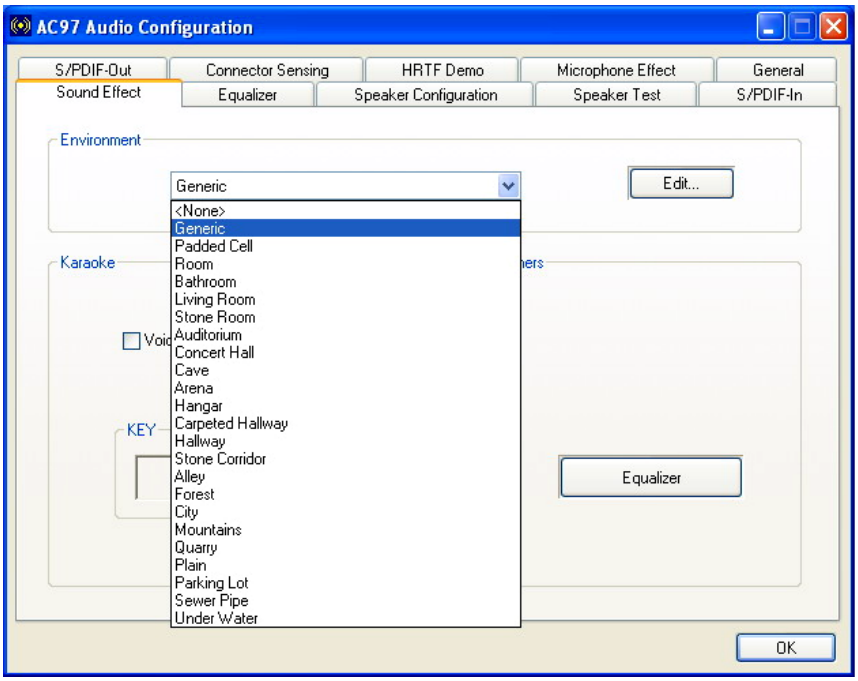

Figure D-4: Setting Sound Effects

D.5 Environment Simulation

This is the default screen whenever the configuration utility is opened.

You may select different sound environment modes by a single click on the Environment pull-down list. There are a total of 23 preset environment modes (see **Figure D-5**). You may also fine-tune the environment setting by clicking the Edit button on the right, which displays an editor window. Select a preset mode you want to edit. Select a preset mode, and then select one the property value from the list below by a single click. Use the scroll bar below to adjust properties setting. When the adjustment is done, click the Save button to proceed.

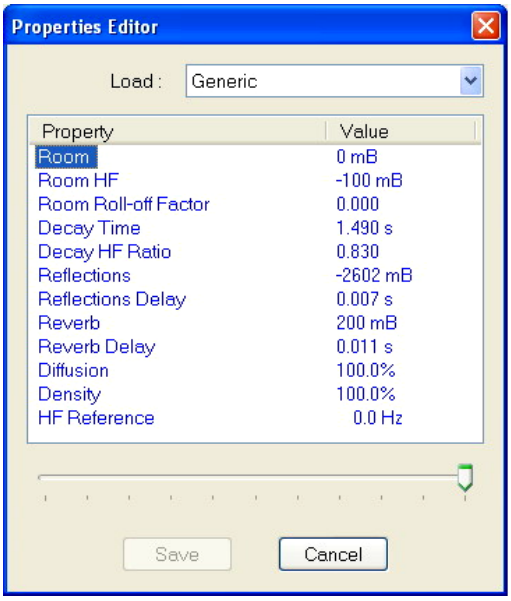

Figure D-5: Sound Effects Properties Editor

D.6 Karaoke Mode

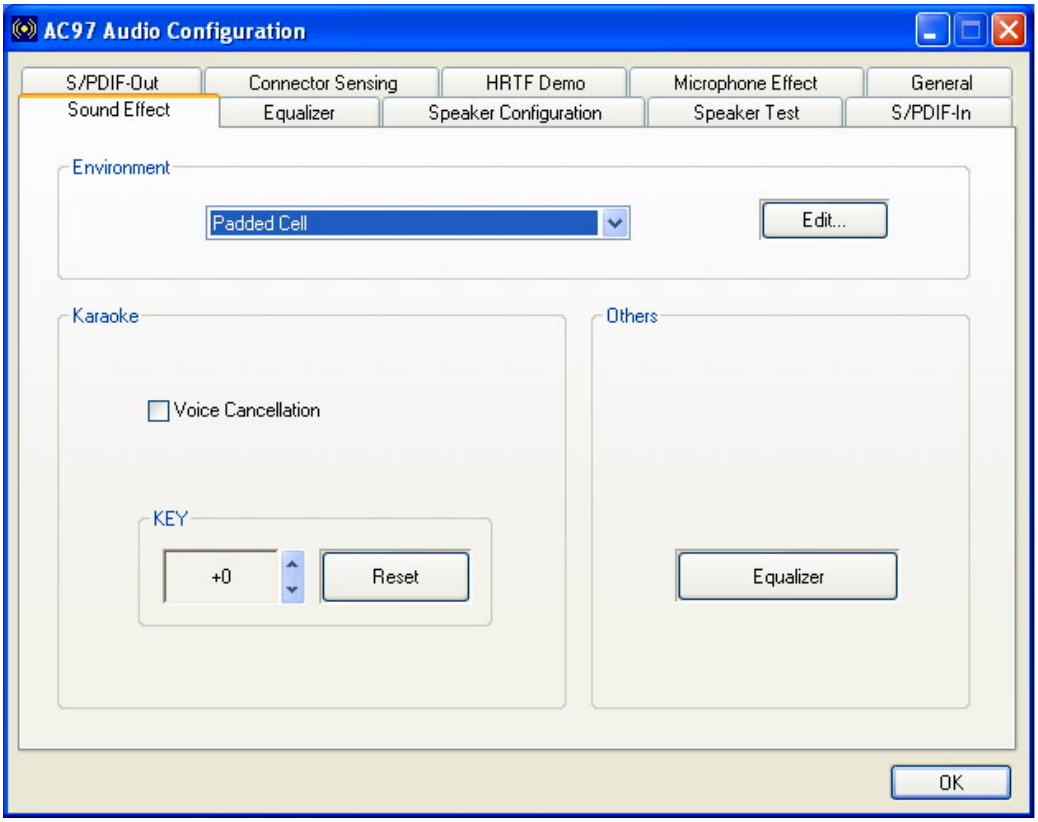

Figure D-6: Karaoke Mode

The Karaoke mode shown in Figure D-6 allows you to eliminate the vocal of the music you play or adjust the key to accommodate your range.

The configuration options that come with the Karaoke function include:

Voice Cancellation: This checkbox, when selected, disables the vocal part of the music your play in your computer while the background music remains.

Key adjustment: Use the Up or Down arrow icons to find a key that fits your vocal range.

NOTE:

The Equalizer button on the default display brings you to the same configuration window as the Equalizer function tab on top of the window.

D.7 Equalizer Selection

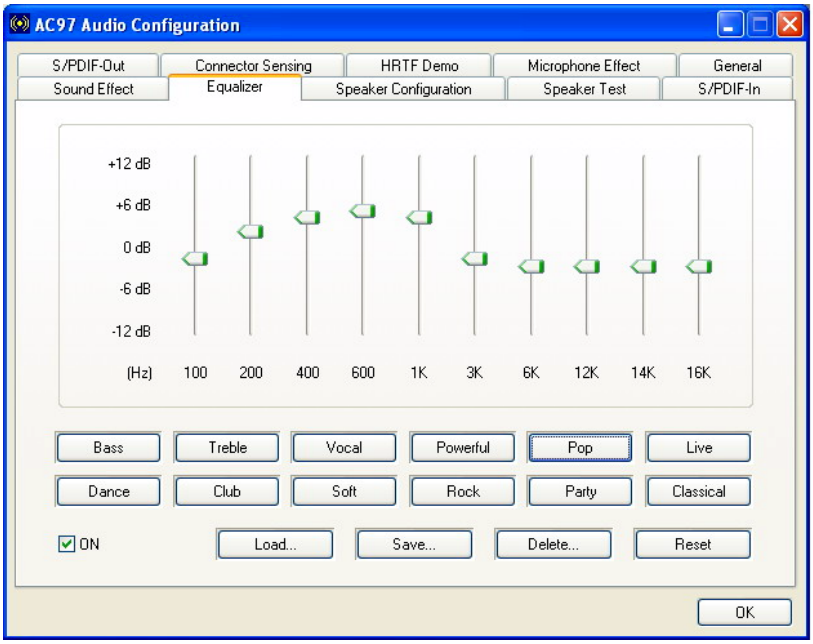

Figure D-7: Equalizer Settings

The equalizer in Figure D-7 allows users to change sound effect parameters. The default screen shows equalized values. You may also select preset modes from the buttons below. The configurable values include 10 bands of equalizer ranging from 100Hz to 16KHz. Use the scroll bar to fine-tune, and use the Load, Save, Delete, and Reset buttons to edit your settings.

D.8 Speaker Configuration

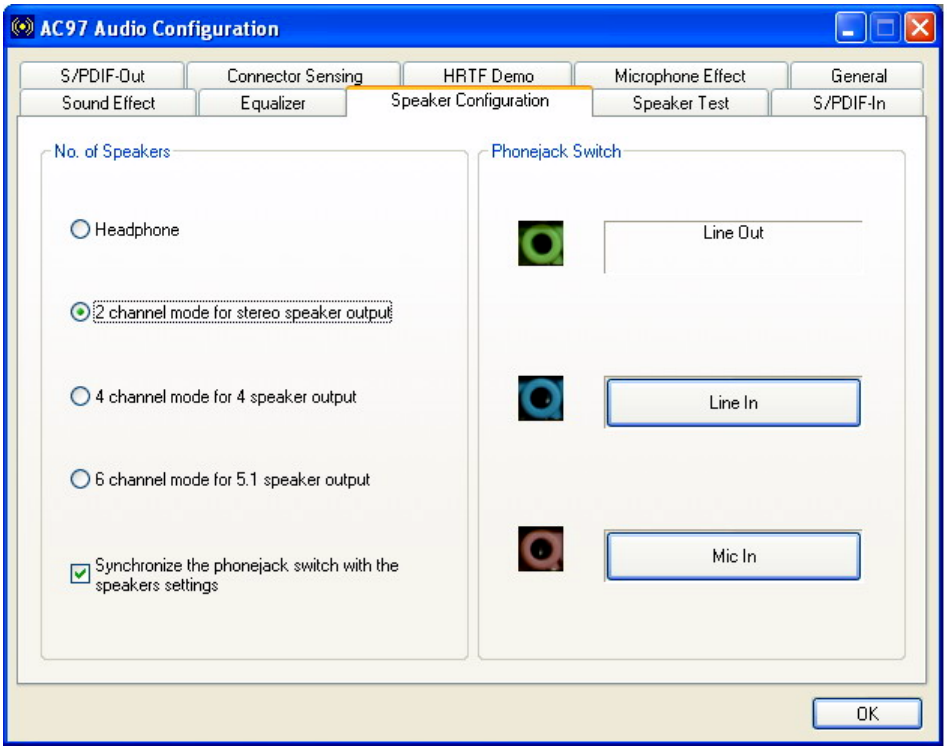

Figure D-8: Speaker Configuration

In this functional window, you can configure your multi-channel speaker settings.

Select the audio configuration from the No. of Speakers section on the left by clicking on one of the check circles.

The configurable options are:

- Headphone
- Channel mode for stereo speaker output
- Channel mode for 4 speaker output

- Channel mode for 5.1 speaker output
- Synchronize the phone jack switch with speakers settings

Select a speaker configuration by selecting its check circle, and then click OK to apply the configuration change.

Connect your speakers to the corresponding phone jacks. It is recommended you write down your configuration, power off the system, and then complete the physical connections.

Select from the Phonejack Switch section if you want to re-define the phone jacks. Click the specific phone jack button for several times to change its input/output functionality.

D.9 Speaker Test

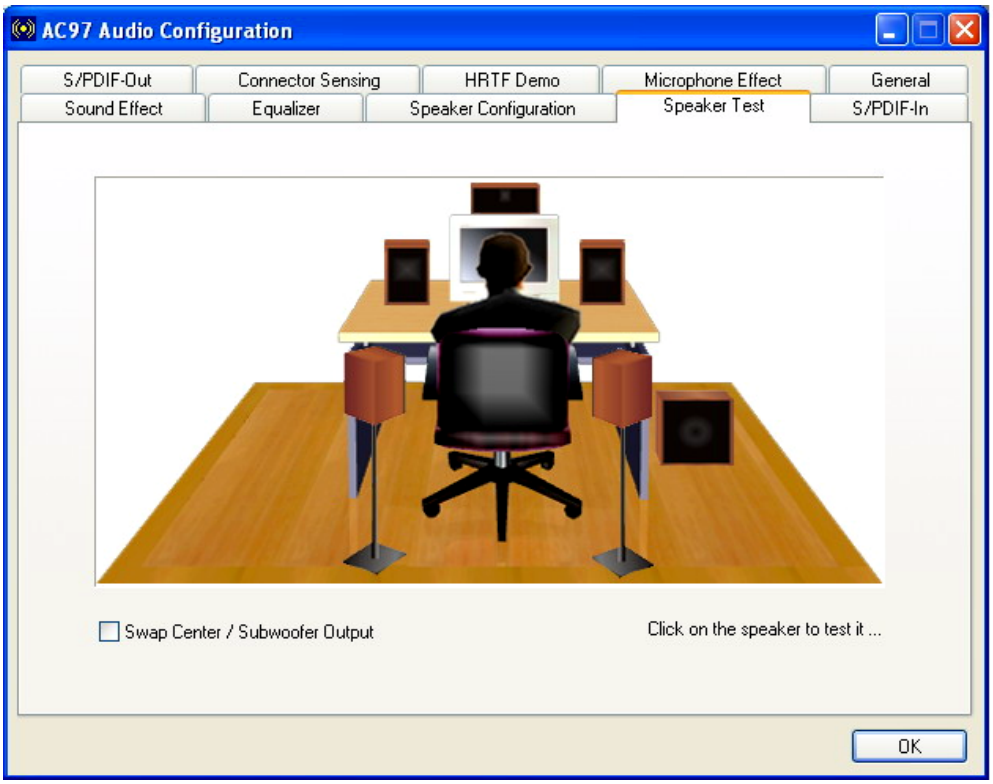

Figure D-9: Audio Configuration

The audio configuration window in Figure D-9 allows you to test each connected speaker to see if your 4-channel or 6-channel audio operates properly. If any speaker malfunctions, you should then check the cabling or replace the malfunctioning parts.

Select each specific speaker to test its functionality. The speaker you selected is highlighted and sound should be generated.

NOTE:

1. The test scenario that appears in the **Speaker Test** window corresponds to the number of speakers you selected in the **Sound Effect** window.
2. You should select and deselect the **Swap Center/Subwoofer Output** check box to see if these two devices properly work.

D.10 S/PDIF-In & S/PDIF-Out

These functions are currently not supported.

D.11 Connector Sensing

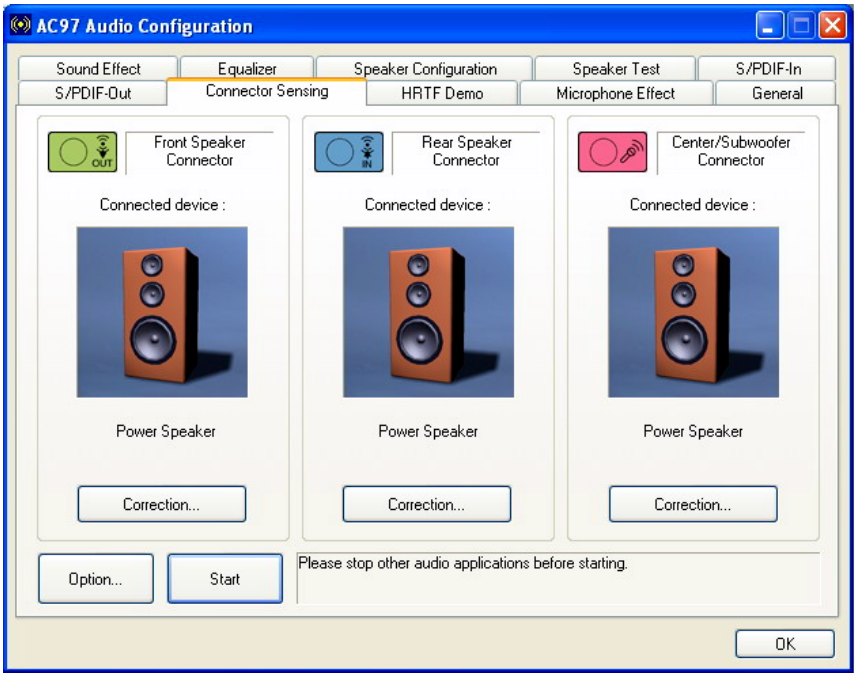

Figure D-10: Connector Sensing

Realtek ALC655 supports Jack Sensing functionality. If an audio device is plugged into the wrong connector, a warning message is displayed informing users to correct the physical connections.

Click the Start button in **Figure D-10** to start the sensing. Please remember to close all running audio-related programs before executing the sensing operation.

The EZ-Connection screen in **Figure D-11** shows the result of sensing test.

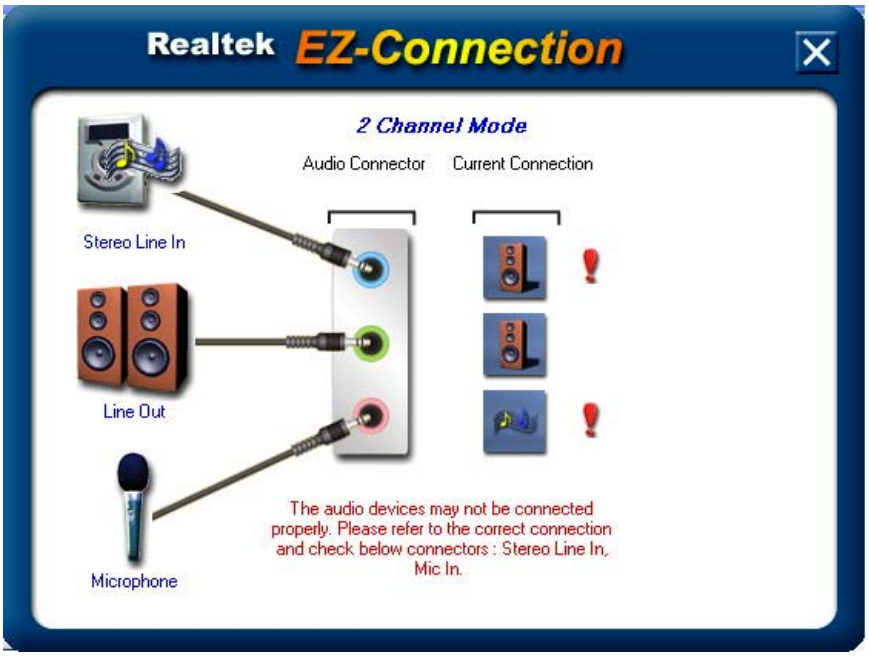
Realtek EZ-Connection
2 Channel Mode
Audio Connector
Current Connection
Stereo Line In
Line Out
Microphone
The audio devices may not be connected properly. Please refer to the correct connection and check below connectors : Stereo Line In, Mic In.

Figure D-11: EX Connection

The “Audio Connector” column shows the settings used in the “Speaker Configuration” window.

The “Current Connection” column shows the types of devices detected during test. If the result does not match the physical connection, an exclamation mark appears. (See **Figure D-12**)

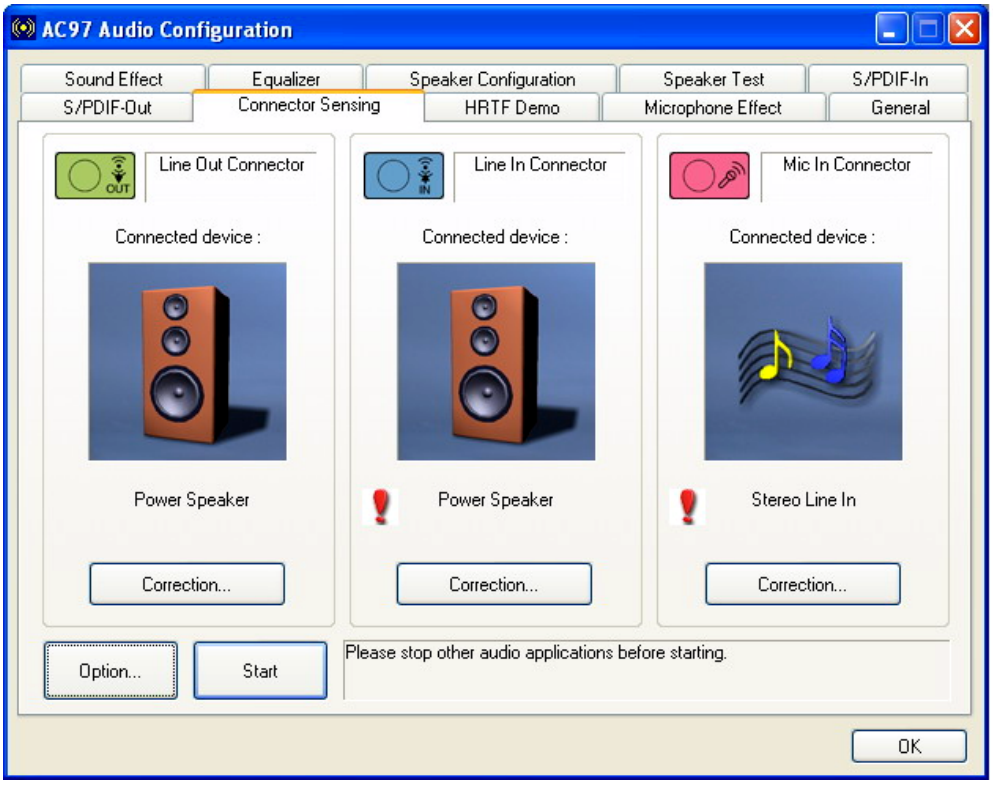

Figure D-12: Connector Sensing Test Result

After closing the EZ-Connector screen, the following window should appear showing the latest connection status.

D.12 HRTF Demo

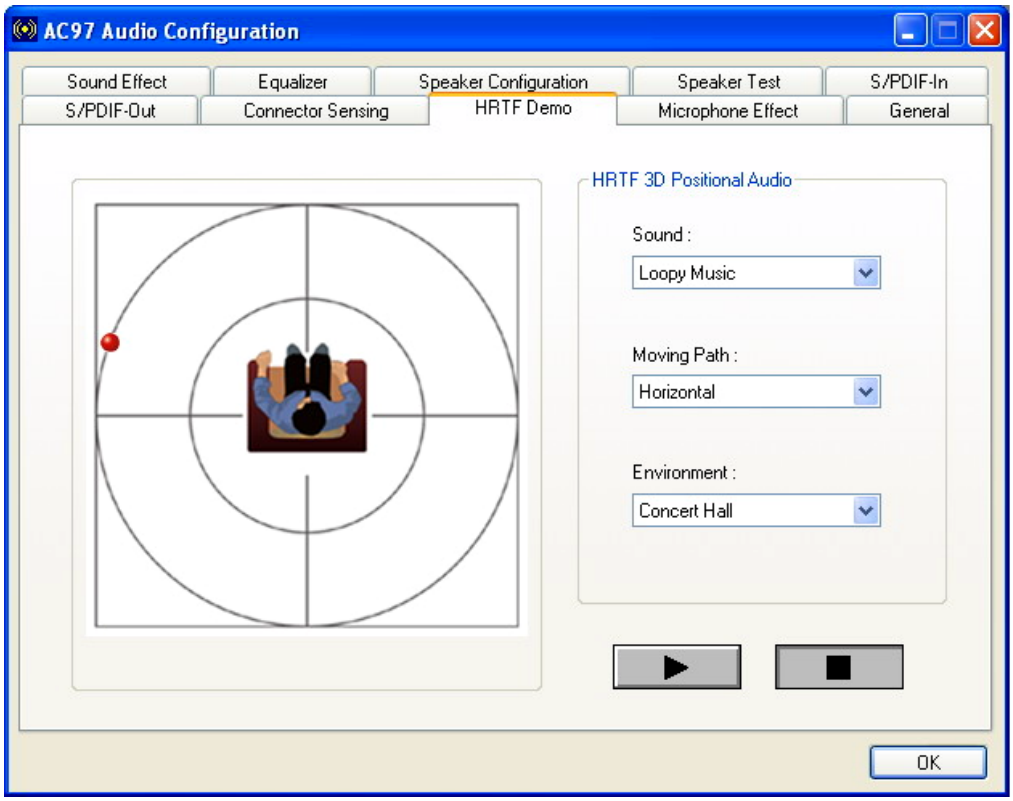

Figure D-13: HRTF Demo

The HRTF window in Figure D-13 allows you to adjust your HRTF (Head Related Transfer Functions) 3D positional audio before playing 3D applications. Select a preferred Environment mode and/or different Sound and Moving Path settings.

D.13 Microphone Effect

This window provides an option, Noise Suppression. Select its check box to enable this functionality.

D.14 General

The general window in Figure D-14 provides information about this AC'97 audio configuration utility including Audio Driver version, DirectX version, Audio Controller, and AC'97 Codec. You may also change the language of this utility through the Language pull-down menu.

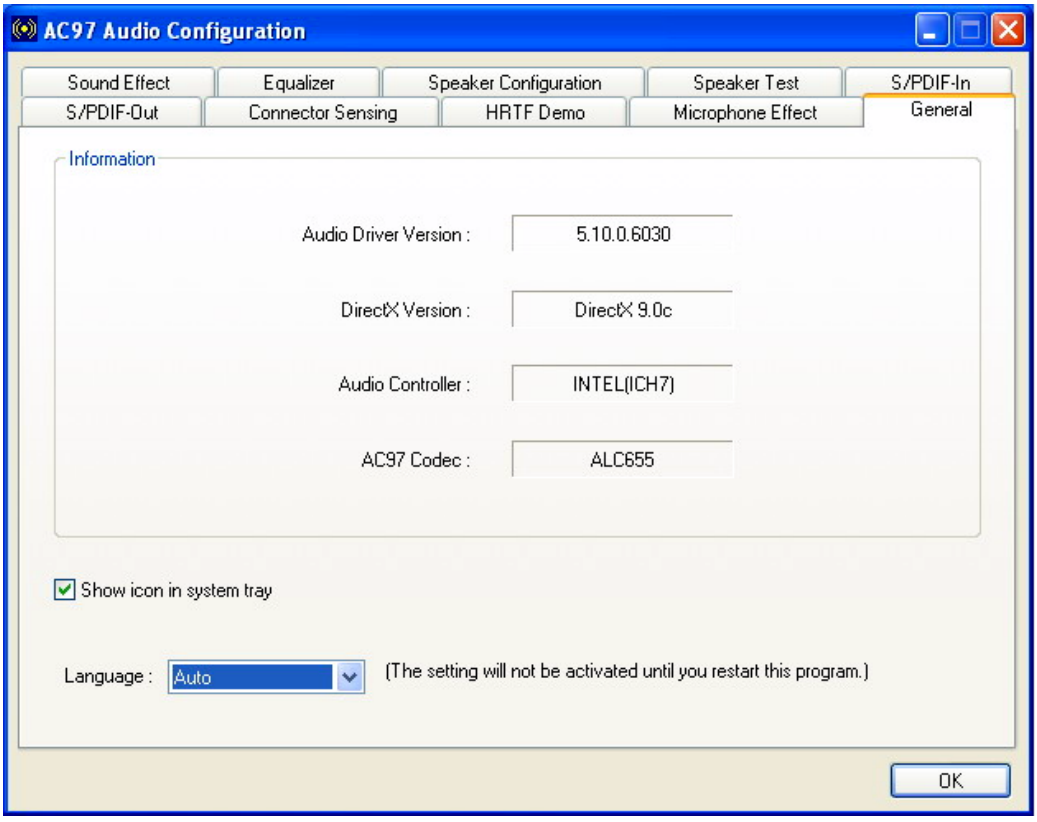

Figure D-14: General

Index

1

10/100 Base-T Intel 82562ET, 19
10/100 Base-T Internet, 28
10/100 Mbps Ethernet, 23

8

852GM, 18, 22, 25, 119

A

AC'97 Codec, 19, 159
ACPI, 12, 19, 89, 144
ACPI Power Management, 23
Address Mapping, 142
Advanced Configuration and Power Interface, 12, 19, 89
Advanced Power Management, 12, 114
ALC655 CODEC, 30
AMI flash BIOS, 19, 29
Application Accelerator, 23
ASKIR, 12
ATA, 12, 66
ATX connector, 17
ATX-12V power supply, 49
Audio, 12, 14, 18, 19, 23, 30, 36, 57, 119, 122, 123, 124, 125, 126, 127, 146, 154, 156, 159
audio jack, 18
audio jacks, 36, 57
automation applications, 14

B

banking applications, 14
battery, 19, 22, 28, 39
battery connector, 35, 39
battery voltage, 28
BIOS, 11, 12, 19, 29, 42, 59, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 99, 100, 101, 103, 104, 105, 106, 107, 108, 113, 115, 116, 134, 135, 139, 143

C

cables, 62, 67
Celeron M, 2
Celeron M, 14, 15, 31, 65
CF card setup, 37, 58
CFII, 12, 15, 36, 52, 53
CFII connector, 52
chassis speaker, 40
chipset driver, 119
Chipsets, 18, 22
CMOS RAM, 19, 28
CODEC, 146, 147, 148
COM, 12, 14, 15, 19, 53
Compact flash device, 65
compact flash type II connector, 52
connector pins, 63
cooling fan, 42
cooling fan connector, 42
cooling fans, 19
cooling kit, 67
CPU board, 15
CPU card, 62, 63, 64, 66, 119, 122, 127, 130
CPU, chipset, 28
CRT, 14, 15, 26, 56, 67, 112, 113
cryptographic functions, 14

D

data flow, 24
data privacy, 14
DDR, 15
DDR2, 65
deep sleep states, 22
digital input output, 39
Digital Input Output Connector, 35
digital signature operations, 15
DIMM modules, 64, 65, 67
DIO, 12, 17, 35, 38, 39
DIO connector, 17, 39
DMA controller, 23, 144
DOS environment, 139
Dynamic Video Memory Technology v2.0, 25

E

Enano-8523-800Z-R10, 14
Enano-8523T, 2, 14
Enano-8523T, 2, 14, 15, 16, 17, 18, 22, 24, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 43, 45, 51, 52, 54, 58, 59, 60, 62, 63, 64, 65, 66, 67, 73, 119, 122, 147
Enano-8523T-800Z-R10, 14
encryption, 15, 26, 27
Enhanced Intelligent Memory Management, 25
Enhanced Rapid Pixel and Texel Rendering, 25
Environment Simulation, 150
EPIC form factor, 14, 15
Ethernet, 18, 19, 23, 36, 55, 56, 67
Ethernet connector, 55
Example program, 140

F

fan connector, 18
FDD, 12
FDD1, 67
Floppy Disk Drive, 12
Front connector, 17
front panel, 40
front panel connector, 35, 40, 41
FSB, 12, 15, 75

G

Graphics Media Accelerator, 127

H

hDD, 35
HDD, 12, 18, 36, 66, 67
HDD Interface, 18
Head Related Transfer Functions, 158
healthcare applications, 14
heat sink, 15, 29, 65

I

ICH4, 12, 18, 22, 23
IDE, 66
IDE channel, 18
IDE connector, 37
IDE device, 15, 17, 28, 66, 77
IDE flat cable, 31, 64, 66
Intel® Extreme Graphics 2, 18, 22, 25
Interrupt controller, 23
inverter connector, 36, 49
inverter power connector, 17
IrDA, 12

J

Jack Sensing, 156

K

Karaoke mode, 152
keyboard/ PS2 mouse cable, 31, 45, 63, 66
keyboard/mouse, 46
Keyboard/Mouse, 36, 45, 67
keyboard/mouse connector, 17, 36

L

LAN, 14, 15, 23, 28, 55, 67, 119, 130, 131, 144
LAN manageability, 23
LCD, 12, 14, 17, 49, 50, 56, 58, 60, 67
LCD Panel, 67
LCD voltage setup, 37, 58
Low Voltage Differential Signaling, 12, 50
LPT, 12, 40
LVDS, 12, 15, 17, 26, 36, 50, 51, 112
LVDS connector, 50
LVDS flat panel, 15

M

Media Access Controller, 12
Microphone Effect, 158
military applications, 14
mini jumper pack, 31, 64
multi-mode I/Os, 14

N

NetBurst® micro-architecture, 22
Northbridge, 18, 22

O

operating temperature, 19, 29

P

parallel port, 17, 36, 47, 85, 86, 87
parallel port connector, 12, 17, 36, 47, 48
PCB circuit, 63
PCI bus, 27
PCI Bus Interface, 18, 27
PCI Local Bus Specification, 23
PCI slot, 17, 18, 35
PCI slots, 23
peripheral connectors, 37, 54, 67
peripheral devices, 66, 67
Peripheral devices, 65
peripheral interface connectors, 34, 35
Power Button Mode, 114
power connector, 17, 35, 43, 44, 45, 64
power connectors, 62
power source, 43
power switch, 40
Pre-Boot Execution Environment, 29
PS/2 connector, 54

R

Real Time Clock, 19, 28
REALTEK ALC655 CODEC, 30
RealTek Audio Driver, 122
rear panel connectors, 36
reset button, 40
Reset CMOS Jumper, 59, 60
RJ-45 Ethernet connector, 18, 55, 56
RoHS, 15
RPM, 28
RS-232, 17, 46

S

SDRAM, 12, 18, 26, 51
secure platforms, 14
security function, 14
serial communications connector, 35
Serial Infrared, 12
serial port connector, 17
Serial Ports, 19
Shift Keyed Infrared, 12
SIR, 12
SiS661CX, 22
SiS964, 23
six-channel audio CODEC, 30
SMIBIOS, 29
SODIMM, 18, 26, 36, 51, 52, 65, 66
SODIMM memory module, 18
SODIMM SDRAM, 51
SODIMM SDRAM socket, 26
SODIMM socket, 18, 51, 65, 66
software drivers, 119
Sound Effect Manager, 148, 149
sound environment, 149, 150
Southbridge, 18, 22, 23
Southbridge heat sink, 65
SpeedStep, 12
stickers, 62
system cooling fan connector, 35
System Management Bus, 23
system voltages, 19, 87, 88

T

TCG v1.2, 26, 27
technical specifications, 18
temperature, 19, 29, 87
timer functions, 23
TPM, 12, 14, 26, 27, 91, 92
TPM 1.2, 14
Trusted Computing Group, 26
Trusted Platform Module, 12, 14, 26

U

UART, 12
ultra low voltage, 22
Unpacking, 63
USB, 12, 18, 29, 41, 54, 55, 68, 92, 93, 94, 95
USB 2.0, 17, 18, 22, 23, 29, 35, 36, 41, 94
USB 2.0 connector, 17, 35
USB 2.0 host controller, 23
USB 2.0 ports, 18, 22, 36
USB connector, 41, 42, 68
USB connectors, 55
USB host controllers, 22
USB host interface, 23
USB2.0, 14, 15, 18, 94, 144
Utility CD, 31, 64

V

VGA, 12, 14, 18, 36, 54, 56, 57, 111, 119, 143
VGA connector, 18, 54, 56

W

warranty validation, 62
Watchdog Timer, 138, 139, 140

Z

zero cache, 14, 22, 31
zero L2 cache, 14
Zone Rendering 2 Technology, 25